# Telephony.

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## The "Service First" Spirit in a Crisis.

The first of the year the New England Telephone & Telegraph Co. inaugurated a "Service First" movement as epitomizing the fundamental spirit of its organization; but it is doubtful if at that time either the subscribers of the company or its officials and employes had any adequate conception as to what the "Service First" idea will really do in a time of crisis calling for the united effort of a large number of workers, laboring unselfishly for the public benefit. The disastrous fire which occurred in the company's telephone building at Worcester, the largest city in Massachusetts outside of Boston, on March 28, supplied the occasion for a convincing and remarkable proof of what co-operation and loyalty in this direction can accomplish. The entire account of the re-establishment of service in nine days in a busy city of 166,000 people, where a system of 20,000 telephone stations carrying a million calls per week was so damaged that not a single local call was possible for 24 hours, is related in the latest issue of the New England Telephone Topics. It is an inspiring story.

Although temporarily disconcerted by their inability to prevent the damage caused by the streams of water played on the intermediate frame of the Park switchboard serving the business district, the relay racks and the test board, the cables and wires of all of which were thoroughly soaked, nevertheless the wire chief and his men, with the one purpose of re-establishing service in the shortest possible time, immediately set about their stupendous task. Within an hour after the fire the work of restoration commenced. The toll operators, quick to grasp the situation, sent the calls which brought the Boston and Springfield officials to the scene by the first trains.

The masterly methods by which the well trained organization soon had the needed equipment and 250 skilled switchboard and plant men headed towards Worcester, was comparable to that which occurs when the "regulars" of the army go into action. At the time of the fire there was not a wire on the intermediate frame of the new Cedar switchboard, but in 24 hours it was in complete working order and service was being given to 3,000 subscribers. Working shoulder to shoulder in 12 and 18 hour shifts, it is probably that no army ever worked harder, than did these men to establish service. The same loyalty and devotion to duty was manifested by the force of over 300 operators, which included reinforcements from Boston and Springfield, and the enormous traffic of a crippled plant was handled in such a spirit of service as to disarm all criticism.

One of the most interesting features of the reconstruction period was the full information given the public as to the problems confronting the company, the efforts and money being expended and the rapid progress being made. This was done by means of prominent advertisements in the daily papers accompanied by full news reports. As a result the public manifested the keenest interest in the remarkable enterprise of the company and was almost without exception inclined to overlook the inconvenience entailed by lack of telephone facilities in a genuine appreciation of what was being done by the band of enthusiastic workers, laboring in behalf of "Service First."

## The Live Man.

It is said that some men can see farther than others; in other words, their powers of observation and deduction are greater. Two persons, observing a given method of doing a certain kind of work, receive different impressions. One has no comments to make but the other has picked out certain portions of the process where improvement can be made. He has used his eyes and his powers of deduction to better purpose than his companion.

A man of this type is known as a "live" man because he sees things: sees their faults and thinks of a remedy. It may be that his first suggestion is not well taken but that does not discourage him. He keeps on thinking of new ways of doing things and can explain clearly and logically why they are an improvement over the old methods. After a while he is recognized as one who does things in ways that are effective and efficient. He has earned the title of a "live" man.

# It's the Silver Lining Turn Now

**By HERBERT KAUFMAN**

We shall never secure a thorough diagnosis of our social troubles if we don't point out the spots where we feel the pains. Yesterday we sought to conceal our communal ailments and endured them in silence.

That we are acknowledging our shortcomings must not be construed as a general epidemic of civic illness, but rather a landwide desire for immediate relief.

Of course this sudden world frankness has stunned staid and conventional people. But, frankly speaking, everybody knew certain unescapable truths all along, and, in strictest confidence, there is not a man or woman who is not secretly relieved at the prospect of an open consideration of problems which have defied individual solution.

It was inevitable that so great a revolt should attract camp followers. For a short while it appeared that we had made a mistake in unleashing our reserve, but the inherent decency and refinement of a majority are already silencing the pens and pencils of those who were foolish enough to interpret the new liberty as a warrant of license.

So do not worry about a shifting phase, but think instead of the immeasurable benefits which the new century is promoting.

Tuberculosis is under control. We've learned how it can be prevented, and we are tolerably sure that we will ultimately discover its cure. Thanks to the adoption of a very simple medical precaution, blind babies are a rarity nowadays.

The public discussion of private diseases has stimulated the search for competent remedies and has led to the adoption of legislative measures to check their vicious spread.

The disgraceful alliance betwen the loan shark and the press is breaking. Tolman is behind the bars, and his fellow usurers must quit the field or follow in his footsteps.

The fraternity of medical quacks, mail order swindlers, and fake financiers have been put to flight by blue sky laws, square journalism and efficient postoffice regulations.

The fly and the mosquito have been unmasked and sentenced to destruction for their crimes against the human race.

Radium promises to be a cure for cancer. Pain is slowly but surely disappearing from operations. The hookworm is perishing from starvation. Infant paralysis and even paresis are slowly yielding to the physician's skill.

Penitentiaries and jails are metamorphosing from human junk piles into repair shops for physical and moral defectives.

Rockefeller, Altman & Co. are organizing philanthropies which would have drained the treasures of medieval empires.

Why, you just can't help being an optimist! Don't snoop for the dark side of the cloud—look at the silver lining.

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# The Bonding of Cable Sheaths to Prevent Electrolysis

**Practical Data for Determining the Size of Bond Best Suited to Particular Cases — The Voltmeter Survey and Its Application in Cable Bonding — Cable Sheath Resistances and Their Calculations — Determination by Use of Curves**

By C. A. Smith

Much has been said of electrolytic corrosion and the destruction wrought by it upon telephone cables, as the many articles which have appeared in TELEPHONY on the subject testify.

The method adopted as standard practice to prevent electrolytic action is to bond the cable sheaths—when the cables are laid in earthenware ducts, or the iron pipes, when this class of construction is used—to the earthed return of the local power system from whence the trouble emanates.

The object of the present article is not to discuss the characteristics of electrolysis, or the electrochemial laws which govern the action, but to offer some practical data which, it is believed, will be of service in determining the size of bond best suited to any particular case.

When a voltmeter survey indicates that current is leaving the cable system to earth at given points, pieces of old power cables or trolley wire are often put in as bonds to carry the extraneous currents away. Such practice is

| Cable size Pairs | Sheath Diam. inches | Sheath Thickness inches | Sheath Area sq. ins. | Ohms per 1,000 ft. | Equivalent Copper Bond B. & S. Gauge |
|---|---|---|---|---|---|
| 1 | 0.280 | .06 | .0415 | 2,255 | 14 |
| 3 | 0.350 | .06 | .0546 | 1.715 | 13 |
| 5 | 0.380 | .07 | .0681 | 1.375 | 12 |
| 10 | 0.465 | .07 | .0870 | 1.075 | 11 |
| 15 | 0.525 | .07 | .0995 | 0.940 | 11 |
| 20 | 0.600 | .07 | .1165 | 0.804 | 10 |
| 25 | 0.660 | .08 | .1455 | 0.645 | 9 |
| 30 | 0.695 | .08 | .1543 | 0.606 | 8 |
| 50 | 0.820 | .08 | .1860 | 0.503 | 7 |
| 75 | 0.980 | .09 | .2510 | 0.373 | 6 |
| 100 | 1.090 | .09 | .2825 | 0.332 | 5 |
| 150 | 1.275 | .10 | .3690 | 0.254 | 5 |
| 200 | 1.460 | .10 | .4270 | 0.219 | 4 |
| 250 | 1.630 | .10 | .4800 | 0.195 | 3 |
| 300 | 1.780 | .125 | .6500 | 0.144 | 2 |
| 350 | 1.910 | .125 | .7000 | 0.134 | 2 |
| 400 | 2.000 | .125 | .7360 | 0.130 | 1 |
| 500 | 2.250 | .125 | .8340 | 0.112 | 1 |
| 600 | 2.430 | .125 | .9040 | 0.104 | 0 |
| 800 | 2.750 | .125 | 1.930 | 0.090 | 0 |

**Telephone Cable Sheath and Bond Data.**

claimed to be both efficient and economical. There can be no doubt about the efficiency, but it is questionable if such practice is always an economy, for although they would be bought as scrap, it is, however, needless extravagance to use such heavy copper conductors, when often much smaller ones answer the purpose. In cases where a number of large sized cables run together, of course, the heavy bonds may be necessary.

It is obvious that no advantage is gained in putting down bonds having greater conductance than the cable sheaths themselves, which are to be protected; furthermore, large stray currents are now being effectively prevented from entering telephone cable plants and the underground metallic structures of other enterprises, due to improved construction in modern street railroad track and power plant methods.

The choosing of bonds of proper capacity is not quite so simple as might be supposed. Each individual case must be treated according to local circumstances, and the size determined from voltmeter measurements and cable sheath resistances for each point affected. To illustrate the importance of these remarks:

Take a simple case of a cable running through a danger

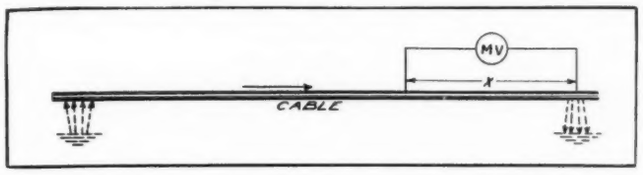



**Fig. 1. Measuring Potential Difference with Millivoltmeter.**

zone: It is not very thorough or scientific to merely locate the point where the damaging current is leaving the cable to ground, and then to put in the first bond which comes to hand. Instead, after ascertaining from the usual voltmeter survey readings that a bond is wanted at a given point, the potential difference, or drop, along the sheath should be taken with a millivoltmeter over a measured length from that point in the direction from where the current enters (Fig. 1). Knowing the drop over a given length, and th eresistance of the sheath, the current flowing may be calculated, and from a wire table the size of bond best suited to carry that current may be determined. This determination should be made under approved rules for carrying capacity to allow for extra current flow due to improved conductance of the bond over the former earth path.

In regard to cable sheath resistances, the accompanying table, based upon standard dimensions for air space telephone cables varying from 1 to 800 pairs, will be of assistance. The resistances are calculated by methods explained later, in ohms per 1,000 feet, against which the sizes of copper conductors having the equivalent conductivity are given in the last column, an interesting comparison.

Since the sheath of a cable is merely a lead tube, the re-

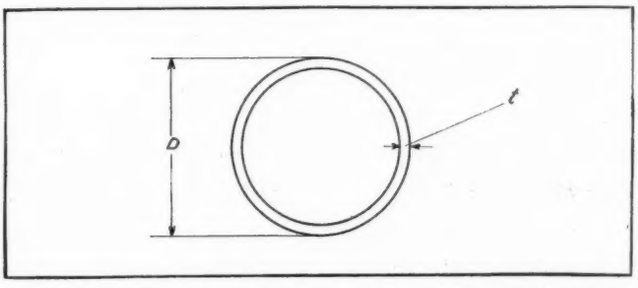



**Fig. 2. External Diameter and Thickness of the Sheath.**

sistance may be readily computed if its external diameter, thickness and length are known, together with the specific resistance of its composition.

The resistance of a conductor is expressed as:

1. Proportional to its length $l$ and inversely proportional to its area of cross section $A$.
2. The material composing it, $\sigma$, and
3. The temperature, $\theta$.

Neglecting the third term, which does not concern us, then the resistance in ohms: $R = \frac{\sigma \times l}{10^6 \times A}$ .....(i).

The area $A$ is calculated from: $\pi\ (D-t)\ t$.....(ii). where $D$ is the external diameter, and $t$ the thickness of the sheath, as shown in Fig. 2.

By reducing the factors $l$ and $A$ to inch measure, and introducing 7.88 for $\sigma$, which means 7.88 micro-ohms per cubic inch (20 micro-ohms per cubic centimetre, the specific resistance of the usual lead-in alloy), the expression (i) simplifies to:

$$R = \frac{.0945}{A} \text{ ohms per 1,000 feet} \ldots\ldots\ldots\ldots\ldots\ldots \text{(iii)}.$$

Or substituting (ii) for $A$, then

$$R = \frac{.03010}{(D-t)t} \text{ ohms per 1,000 feet} \ldots\ldots\ldots\ldots\ldots \text{(iv)}.$$

It is interesting to observe, however, that if the diameters of the tables given in the table are plotted against the corresponding resistances, a curve will result of the form

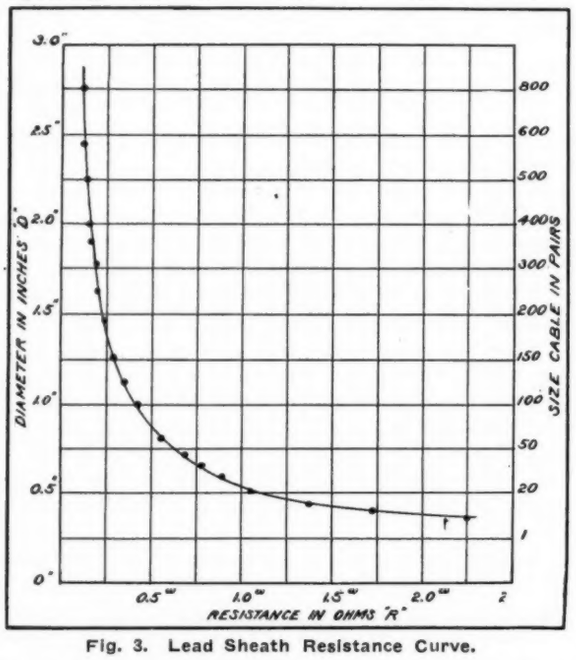



**Fig. 3. Lead Sheath Resistance Curve.**

shown in Fig. 3. This curve is parabolic in character, and in mathematical language of the class where

$$D = \alpha\ R^{-n} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(v)}.$$

It at once reveals a quick and ready means of computing the resistance of any size cable sheath when its external diameter is known, within the range of standard cable dimensions.

The writer has determined the constants for the empirical formula (v) from the curve, which simplifies to:

$$D = .50\ R^{-.7} \text{inches} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(vi)}.$$

from which $R = \left(\frac{1}{2D}\right)^{1.43}$ ohms per 1,000 feet.....(vii).

With the aid of logarithms, or a slide rule, the value for $R$ can be obtained at once, i. e., the sheath resistance per 1,000 feet at 0° Cent. using expression (vii).

From what has been said, a close value of the current flowing can now be calculated if the potential difference $PD$, between two measured points in feet $X$ is taken with the millivoltmeter and then divided by the resistance r, of the length included.

That is: $I = \frac{PD}{r}$ amperes.....(viii).

where $r = R\ \frac{x}{1{,}000}$ ohms.....(ix).

Suppose, for instance, that 215 millivolts is the drop over a length of 100 feet of 300-pair cable sheath. From the table, $R$=.144 ohms then by equation (ix):

$$r = .144 = \frac{100}{1{,}000} = .0144 \text{ ohm.}$$

By equation (viii), $I = \frac{.215}{.0144} = 14.95$ amperes.

A No. 12 B. & S. gauge copper wire under rules of the Institution of Electrical Engineers, allows of 17 amperes for rubber covering, and 23 amperes for weatherproof covering. But, since the wire is to be laid in the ground, the higher value can be aimed at and would provide ample margin for extra current due to better conduction. That is to say, the conductor which will carry the required current or a little more at the lower rate should be chosen, so that it will take care of any excess up to the higher value, because being laid in the ground any small amount of heat generated would be easily radiated.

When a number of cables run together in a given direction and are subjected to electrolytic action at the same point, the sheath resistances should be ascertained and the currents traversing them calculated for each separately. The sum of these individual currents will then enable the size of bond required to be found.

## Tri-State Convention Program.

The seventh annual convention of the Tri-State Independent Telephone Association will be held at the Southern Hotel, Jackson, Tenn., on May 19 and 20. An interesting program has been arranged and an unusually large attendance is expected. The program follows:

TUESDAY MORNING SESSION 9 A. M.

Meeting of the board of directors at Association headquarters, Southern Hotel.

Address of welcome, by Hon. C. E. Griffin, mayor of Jackson.

Response, by W. H. Bryant, Mobile, Ala.

President's address, by W. H. Bryant.

"The 'No-Account' Department of the Telephone Business," by W. S. Vivian, Chicago, Ill.

"Are Toll Lines a Profitable Investment for the Little Fellow?" by M. L. Shannon, Pontotoc, Miss.

TUESDAY AFTERNOON SESSION, 2 P. M.

"The Interstate Commerce Commission's Accounting System for Small Companies," by F. B. MacKinnon, Washington, D. C.

"Independent Telephone Properties from an Investment Standpoint," by J. C. Kelsey, Chicago.

"The Treatment of Poles, Cross Arms, and Exposed Construction with Wood Preservative," by J. B. Wilkinson, Louisville, Ky.

Visiting Exhibits, third floor of Southern Hotel, 4 to 6 p. m.

WEDNESDAY MORNING SESSION, 9 A. M.

"The Government's Attitude Toward the Bell Co.'s Qualified Toll Line Contract," by Terry W. Allen, Jackson, Tenn.

"My Views of the Bell System's Qualified Toll Line Contract," by Albert Parlette, Bristol, Va.-Tenn.

"Transmission Losses Caused by Poor Engineering and Some Remedies," by G. A. Joy, Chicago, Ill.

General discussion of the American Telephone & Telegraph Company's qualified toll line contract.

WEDNESDAY AFTERNOON SESSION, 2 P. M.

"Do Traffic Distributors Justify the Expenditure?" by J. C. Duncan, Knoxville, Tenn.

"Short Talks on Technical Subjects," by F. A. Rader, S. M. Lewis, C. O. Davis, Thomas Hall, and Elsworth Keith.

WEDNESDAY EVENING, 8 P. M.

Smoker, Southern Hotel.

# The Telegraph and the Telephone in Railroad Service

**Comparisons of Telegraph and Telephone in Train Dispatching Including Data on First Cost, Operation and Maintenance—Advantages and Disadvantages of the Two Systems—Abstract of Paper Presented Before American Institute of Electrical Engineers**

By M. H. Clapp

From the beginning of the operation of railroads in the United States in the early 30's until the early 50's, a period of 20 years, there was no system provided for rapid communication from one station to another. Trains were run on what was called the "time-interval system;" briefly, a ruling train had the right of one hour against all opposing trains of the same class. This practise continued for nearly ten years after Prof. Morse had sent his historical message from Washington to Baltimore. At about that time the Erie Railroad Co. constructed a telegraph line, which was first used, apparently, for handling local messages along the road. Finally, in 1851, a train was successfully handled by a telegraph order for a distance of 14 miles (22.5 km).

### Beginning of Telegraph Dispatching.

From this small beginning the handling of trains and messages by telegraph increased very rapidly, until, about ten years later, the telegraph was quite common on the railroads of the country. Contracts were early made between the railroads and the commercial telegraph companies whereby the same pole lines were used by both parties to support their wires along railroad rights-of-way. In the end, the telegraph became an established and invaluable adjunct in railroad operation, as will be described in more detail.

Although the Morse register was early done away with, and messages received entirely by sound, there was some opposition to this on account of the loss of the permanent record, especially when dispatching trains. This matter of not having a record was one of the principal reasons that the telephone was not sooner used for the dispatching of trains; but when this objection to the telephone is analyzed, we find that there is really no difference between the receiving of a message by sound on the telegraph as compared with receiving a message on the telephone, as no record is made in either case by the electrical or mechanical equipment proper. Apparently some of the persons who objected to the use of the telephone on account of its alleged lack of record, had in mind, when they considered the telegraph, the old Morse registers that were first used on the early telegraph circuits.

The railroads early began to use the telephone on different parts of their systems. As the commercial development of the telephone was very slow in this country up to 1890, it would apparently follow that there was not very much use of the telephone on the railroads during the same period. However, the records show that different railroads in the early eighties began to put in telephones for various purposes; not so much, however, to replace the telegraph, as to replace messenger service and to serve as an auxiliary to the telegraph. The replacement of the telegraph by the telephone, to any extent, really began only six or seven years ago. It is only during this short period of time that extensive installations of telephone dispatching and message circuits have taken place, although beginning about 15 years ago there were numerous telephone circuits erected between terminals and principal offices on some of the railroads. These long haul talking circuits did not primarily replace the telegraph, but in most cases merely provided additional means for communication.

While trains were handled for short distances, principally in and about terminals, beginning back in the early nineties, it was not until the latter part of 1907 that any real attempt was made to handle trains on long stretches of main line track by telephone. The Chicago, Burlington & Quincy road was one of the first to use telephone train dispatching circuits on its main lines, and by the latter part of 1908 this company had a considerable mileage of its lines dispatched by telephone. The principal railroads in the East and the middle West at once began to install telephone circuits, so that at present there are some 70,000 miles (12,654 km.) of railroads in the United States dispatched by telephone.

The use of the selective ringing telephone circuit for the dispatching of trains was soon followed by the use of the same kind of circuit for handling of messages. The growth of the telephone message circuit has, however, been very much slower than that of the dispatching circuit. The primary reason for this is the fact that the telephone message circuit does not meet the conditions on the average railroad to the same advantage as the dispatching circuit, there being more complications to meet than in the case of the dispatching circuit. In general, the message circuit requires a considerable amount of traffic to justify its use. However, it will only be a question of time when all telephone dispatching circuits are paralleled by telephone message circuits.

### A Typical Railroad Telegraph System.

The outside and inside plants used by different railroads necessarily vary to a large degree on account of the different sizes, resources, locations and conditions of the railroads served. A description will be given, therefore, of the system on one of the large transcontinental railroads with which the writer is most familiar, with particular reference to the conditions about seven years ago, when the present extended use of the telephone for dispatching trains and handling messages had its beginning. It will not be necessary to describe in detail the pole lines used to carry the wires, either telegraph or telephone. It will be sufficient to say that these lines in the United States are in a great majority of cases constructed in accordance with the specifications of the Western Union Telegraph Co., which is substantial construction. These pole lines have at least 35 poles to the mile, where the number of wires to provide for is considerable, and in some cases, 40, 50, 60 and even 70 and 80 poles per mile are used.

At first iron was universally used for telegraph wires, the size most used being No. 8 B.W.G., thoroughly galvanized. This practice, in general, was not changed as far as the railroads were concerned, except that a considerable amount of copper was put up for long haul circuits. Of course, copper wire is used quite extensively near large centers or along the seacoast, or wherever corrosion would be troublesome. When copper wire is provided, No. 9 A.W.G. is generally used.

The average cost per mile (1.6 km.) for furnishing and erecting a No. 8 B.W.G. iron wire, including insulators, tie wires and pins, is about $25.00. This wire makes a very good telegraph circuit up to 400 miles without any intermediate offices. At this distance the wire can be worked either singled, duplexed or quadruplexed. With intermediate (way) offices on the line the above mentioned distance would be cut down to about 200 miles (321.8 km.). The matter of line in-

sulation has a very important bearing on the distance that an iron wire or, in fact, any telegraph wire can be successfully operated. The distances given above assume a high grade of insulation. This mileage for the operation of iron wires, however, is ample for almost any division of a railroad, so that iron wire is very generally used in railroad local (way) circuits, copper wire being used between terminals and the principal points along the line. On the Northern Pacific system, when telephone circuits began to be extensively installed, about seven or eight years ago, there were the following mileages of copper and iron wires in use: Copper, 4,000 miles (6,437 km.); and iron, 11,500 miles (18,507 km.).

There were practically two through copper wires from St. Paul to Tacoma, a distance of a little less than 2,000 miles (3,218 km.); all the rest of the circuits on and between the different divisions were iron. At that time this wire plant was considered a very good one for the purpose for which it was intended.

The cost per mile for providing and erecting No. 9 B. & S. gage copper wire, including insulators, pins and tie wires, varies greatly with the price of copper, but assuming 15-cent copper, it would be, on the average, about $38.

The equipment of a telegraph office is comparatively simple and needs no description. The following costs will be of interest in comparison with the cost of telephone equipment.

| | |
|---|---|
| A way station can be cut-in on a telegraph wire, including the battery (gravity) in the office, at a total average cost of | $ 12 |
| A switchboard (peg type) large enough to take care of ten wires, in and out, can be provided and installed at a cost of | 42 |
| The cost of providing and installing a 25-line Western Union switchboard, with 20 wires cut in and out, eight sets of telegraph instruments with necessary tables and battery, is about | 140 |
| A 19-conductor cable (No. 14 A.W.G.), suitable for connecting the wires from the line into the offices, can be provided and installed at an average cost of 30 cents per foot. | |
| The average cost of providing and installing a quadrupiex set would be about | 200 |
| The average cost of providing and installing a single line repeater set would be about | 50 |

At terminals, of course, more apparatus is necessary than at the way stations along the line. However, a cost of $400 would provide and install the equipment in almost any terminal or relay office along the line, except the very largest. While the above-mentioned figures are approximate, and are averages for conditions on the transcontinental line with which the writer is familiar, they are believed to be reasonable and to give some idea of the cost of providing telegraph circuits along a railroad.

### Principal Advantages of the Telegraph.

The principal advantages of the telegraph are its simplicity and its small cost, both as regards installation and in maintenance this statement being made, of course, in comparison with the telephone. There are no very complicated circuits in connection with the telegraph, especially at the great majority of the offices along the line. The ordinary lineman has no difficulty in learning how to install and maintain sets of telegraph instruments, and with a little experience, he is able to install duplex and quadruplex apparatus, and Western Union peg switchboards. In general, no particular care is necessary in running telegraph circuits, with respect to one another, in order to avoid induction either in the offices or on the line.

In making the last statement, however, the author fully appreciates that telegraph circuits have been seriously interferred with by induction in certain cases; the conditions in mind are those which exist, as a rule, on the great majority of railroads where the telegraph is used. Also, a telegraph circuit will operate under defective maintenance conditions, such as loose connections, unsoldered joints, defective office and cable box wiring, high resistances in series with circuit, etc., where a telephone circuit would absolutely fail. In other words, the telegraph circuit usually has a considerable amount of margin in operation and will stand a large amount of neglect and abuse.

The cost, as already indicated, is small for both line wires and office equipment, and while copper wire is used to some extent, iron wire serves the purpose in a great many cases where it would not be possible to use it in connection with the telephone. The telegraph, also, has the advantage of being a very accurate means of communication. A telegraph sounder makes very clear and distinct signals, and to an expert operator, there is no question as to what has been transmitted; and, if the wire is working at all, the distance is not much of a factor, because the sounder is in a local circuit.

### Disadvantages of the Telegraph.

The great disadvantage of the telegraph is its lack of universality. It requires a specialist in order to operate it; that is, an operator who has spent a considerable amount of time, years in some cases, in order to qualify for the work. When carrying on a telegraphic correspondence, one is always working through some one else, never directly. This condition is satisfactory in handling some kinds of business, but not for all kinds. The train conductor out on the line can, in the case of an accident, send messages by telegraph to his superior, if there is a telegraph office near at hand in which operators are on duty, and accomplish results; however, if he can talk directly with his superintendent, a great deal more can be accomplished. The same is true of the section foreman out on the line, the superintendent in his office, and other employes on the division.

There is a decided lack of ability to secure information of the thousand and one emergencies that arise on a railroad, by telegraph, as quickly as desirable. This is due, first, to the fact that comparatively few employes on the system can use the telegraph directly, and second, to the fact that the telegraph is slower as a means of transmitting intelligence than its great competitor, the telephone. It takes longer to transmit a train order by telegraph than by telephone. This advantage of the telegraph is especially noticeable when one attempts to discuss any subject over the wire by telegraph, even between expert operators; and where it is obligatory to write out the necessary questions and answers in the form of messages to be sent and received by operators, the superiority of the telephone is even more evident.

The telegraph is at its best in handling messages that are comparatively brief, making definite statements or reports or answering definite questions. As soon as one atempts to ask several questions on different phases or points of a subject, in other words, attempts to discuss it, the telegraph becomes a comparatively slow means of communication.

Trouble is also experienced from delay in getting the offices along the line to answer their calls. In case several wires are looped into an office, and the operator is busy, he may not hear the call when made, or perhaps will pretend that he does not, and it is impossible to prove definitely whether or not the call came in properly. Some attempts have been made to meet this difficulty by providing a telegraph selector at each station that would respond to a certain combination of signals and ring a bell for the particular station desired. However, this device has not been used to any extent by the railroads.

There is, also, the trouble experienced in obtaining operators, which in recent years has become a serious problem, especially when times are prosperous. A railroad which de-

pends at present entirely upon the telegraph has considerable difficulty in securing operators of any kind, without regard for their ability. There has been a great falling off not only in the supply, but in the grade of men who enter this field. Twenty or thirty years ago, the conditions were strikingly different, for the reason, perhaps, that there were not then the many opportunities for men to enter electrical pursuits that there are today. Then there is the influence of the labor organization. Practically all railroads have a strong labor organization of telegraphers with which to contend. In making promotions, the labor union appears always to desire to have seniority in the service made the primary consideration, and ability or fitness for a position the secondary consideration. In general, this seniority tends to drive the best men out of the service and prevents the ablest men from learning to telegraph.

### The Railroad Telephone Plant.

The outside plant necessary in connection with the telephone is substantially the same as that required for the telegraph, except that in practically all cases copper wires are used. Two wires, however, are necessary in order to provide a metallic circuit, and they must be arranged side by side on the cross arm and transposed at frequent intervals in order to avoid induction and cross talk from other circuits. All cables used in looping telephone circuits into offices must have their conductors arranged in twisted pairs, in order to avoid cross talk.

The great difference between the telegraph and the telephone plants is in connection with the inside plant. Instead of the comparatively simple apparatus, already described, the telephone equipment is more or less complicated. There is first the private branch exchange, which has become so important a part of railroad operation in so many places. These exchanges are, in a great many cases, rented from the telephone companies at the usual rate. However, there are numerous exchanges privately owned and operated, the latest type to be used being the automatic switchboard. Arrangements are made to bring into these branch exchanges the telephone lines of the railroad between the different division points and terminals, to facilitate ready intercommunication. Also, in some cases, arrangements are made so that a railroad official can talk from his office over the lines of the railroad company to any subscriber's station in the public exchange system in a distant city or town.

The cost of telephone circuits for use between the exchanges along the line depends, of course, on the kind and size of the line wire used. The cost per mile of a No. 9 A. W. G. copper circuit in place, on the basis of 15-cent copper, is about $75. The cost per mile of a No. 6 A. W. G. copper circuit on the same basis, would be about $150. The latter circuit would give, under ordinary conditions, satisfactory telephone transmission up to 1,000 miles, while the former would be satisfactory up to about 500 miles (804.6 km.).

The telephone dispatching and message circuits are the most interesting and peculiar to the railroad service. The provision of a means of selectively signaling the different stations along the line was a problem that took some time to solve satisfactorily. These selectors have different designs and principles of operation. In general, the selection is made by a step-by-step mechanism which responds to a certain number of pulsations or combinations of pulsations sent over the line, making it possible to arrange a large number of selective combinations, and thus signal any given station at will, without disturbing the others. Selectors are now made that are very efficient in operation, and will call selectively as many as 125 stations on the same line.

At the stations along the line a special form of telephone set is installed for the use of the operators. These sets have a certain combination of apparatus and wiring that provides a so-called "booster" effect in transmission. This is secured by a switch which is so connected in the circuit that when the operator is talking, the receiver is short circuited, and when the operator is listening, the receiver is connected directly to the line and the transmitter disconnected. Head telephones are provided so that the operator may have free use of his hands.

In the dispatcher's office, special telephone sets are used which are wired like the sets at the way stations, except that chest transmitters are usually provided so that the dispatchers can move about sufficiently in making entries on the train sheets, which are usually of considerable length and width. Some of the railroads have experimented with, and are using with some success, loud speaking transmitters and receivers for the dispatchers. This apparatus, however, has not been developed to the point where it can be used successfully in all cases. Loud speaking apparatus is greatly to be desired, as the dispatchers complain quite generally of the hardships of wearing continuously the head telephone and the chest transmitter.

The batteries used at the way stations are in most cases composed of dry cells; they are also used in the majority of cases for the line-battery in the dispatcher's office. These cells are, on the whole, the most economical, as the line current necessary to operate a selector is rarely over 10 milliamperes and in some cases is as low as 1.5 milliamperes. However, small generators are used in some cases to furnish the necessary ringing current; storage cells, also, are used, and both are economical where the circuits are long and there are numerous busy stations on them. In a few cases, secondary battery is used at the way stations, but it is not general practice, primary cells being in the great majority of cases the most economical. Wet primary cells are often used for providing the current for the dispatcher's transmitter.

The cost of providing a selector circuit ready for operation under average conditions is as follows:

Cost per station of providing and installing the selector and telephone equipment, protectors and wiring, both outside and inside of the offices, $80.

Cost of providing and installing the necessary telephone and selective apparatus, including the battery, in the office of the dispatcher, $250. Assuming that a telegraph pole line is already available, the cost of a suitable telephone circuit has already been placed at $75 per mile, so that the cost of providing and installing a selective telephone circuit along 100 miles (160.9 km.) of railroad, where there are 30 offices to serve, would be a little over $10,000.

A telephone circuit as described above can be used either as a dispatching circuit or as a message circuit. In arranging for the handling of messages by the telephone, the operator at the terminal office usually remains on the line continuously, thus requiring signaling in one direction only. Often separate rooms are provided for the telephone operators; but in some cases they are placed on opposite sides of the same tables which the telegraph operators use, with good results. The number of messages that can be handled on a telephone message circuit will average twice the number that can be handled by telegraph between the same offices, especially if a typewriter is used in receiving.

*(To be concluded.)*

### Inauguration of Automatic System in Argentina.

The automatic telephone exchange erected by the United River Plate Telephone Co. in Cordoba, Argentina, has just been inaugurated. The installation has been completed some months, but, due to litigation about the patent rights, a delay was caused. This is the first automatic telephone exchange in South America and its working will be watched with considerable interest. The company has ordered a similar exchange to be installed in Rosario.

# The Lines of Development of Telephonic Inventions

**Principles Involved in Transmitter and Receiver Design Still the Same as Outlined in the Fundamental Patents —New Lines for Investigation—Inducements to Inventors for Directing Efforts to Developing Instruments Based upon Principles Different from Those now Used**

By A. P. Connor

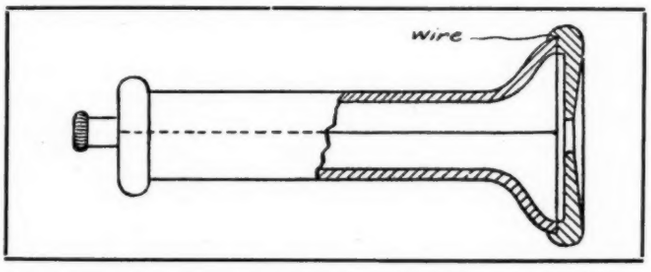
It seems to be the tendency to extol the development of the telephone art on one hand, and to criticize it for lack of development on the other. This apparent inconsistency is, however, explained by an analysis of the subject. The lack of development, or rather progress, refers to the theoretical side of the art, and the other to the practical or more material phase of the subject. Those familiar with the art well know that the same principles are used for causing the telephone to operate now, as were outlined in the fundamental inventions referring to the receiver and transmitter, which are based on the magnetic theory, and the pressure resistance of carbon, respectively.

The types of construction used to make use of these principles are many, as may be noted by reference to the accompanying illustrations from selected patents. But why is the receiver limited to the magnetic theory, and the transmitter to carbon in every case? If the telephone art is to keep to these principles alone, it will find that there are many problems which it will not solve and its progress will be comparatively limited.

That there are other lines for investigation is almost a matter of fact, because it is customary to consider that anything can be accomplished in these days, especially since wireless telegraphy has been invented, and X-rays introduced to look through opaque matter. Flying machines are common and many other products of inventions have made possible accomplishments which seemed impossible only a few years back. In fact, while all this has been going on, the telephone art has attained but little more in a theoretical line, than it had a lifetime ago.

The question then naturally arises: where are the new lines for investigation to obtain new theories on which to develop a new system for the transmission of sound? Some may question where the need of such investigation is, and others may ask what good will any information obtained, be? Some suggestions as to the lines on which investigation may be made with profit, will be made in answer to the first question, as indicating the lines which seem to offer the desired encouragement. A practical suggestion was made some years ago, in the American Telephone Journal, in a reference to an experiment made by the writers of an article to the use of an electro-thermal principle. The device was a transmitter or receiver, and consisted of a piece of wire tightly strung between a diaphragm and a stationary post, with a casing around it. The general arrangement of the parts is shown in one of the accompanying illustrations.

The flames of certain gases are highly sensitive to the effects of sounds and would seem to be applicable to telephone uses, even if only for laboratory use in the beginning. Direct

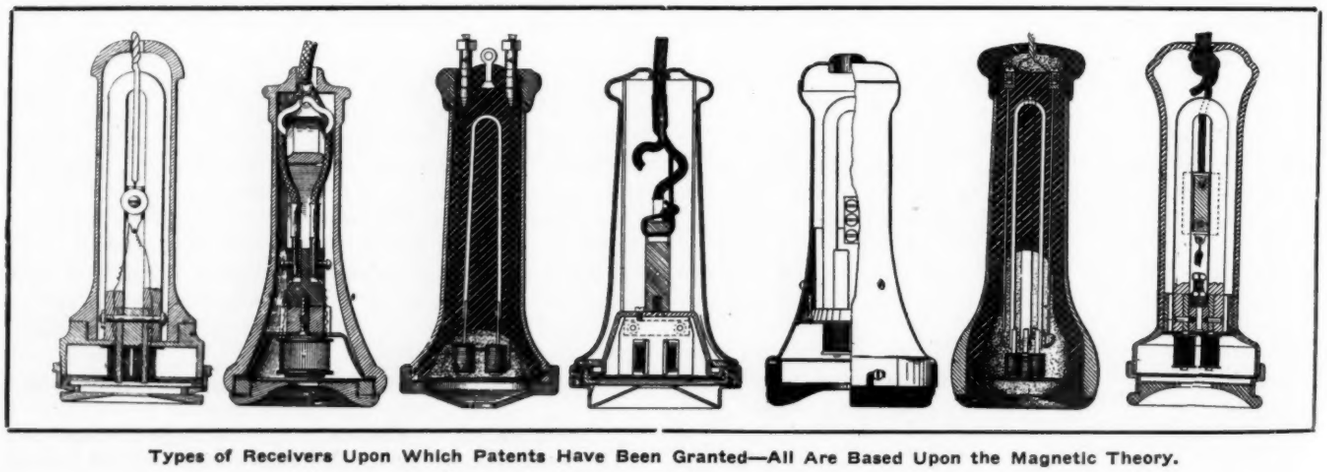



**Receiver Construction Based Upon Electro-Thermal Principle.**

mechanical use of the force, timbre and pitch of vocal sounds have not been employed, except in an indirect way in the case of a carbon transmitter. There also appears to be a field for the development of a chemical receiver with transmitter, which, if further developed, might be evolved into an accumulator of voice records. Such a telephone would seem to be dependent upon electrolytic action.

Direct telephone action without the use of coils and other interposed apparatus ought to be feasible. The use of greater currents and voltages ought to be possible, even if on the principle of relays, and would go a great ways in the solving of the real long distance telephone problem. Surely the telephone art is not dependent on the magnet alone for a proper transmission of vocal sounds.

Carbon has been used for transmitters since the beginning of the telephone art, even as it was in the incandescent lighting industry for so long a time. The carbon incandescent lamp is now becoming comparatively obsolete, being displaced by tantalum and tungsten, but it is still the great factor in transmitters. Why? The wireless telegraph art, although so new, seems to point out a series of substances which might displace carbon, and reference is made to silicon, etc., which is used in the wireless detectors.

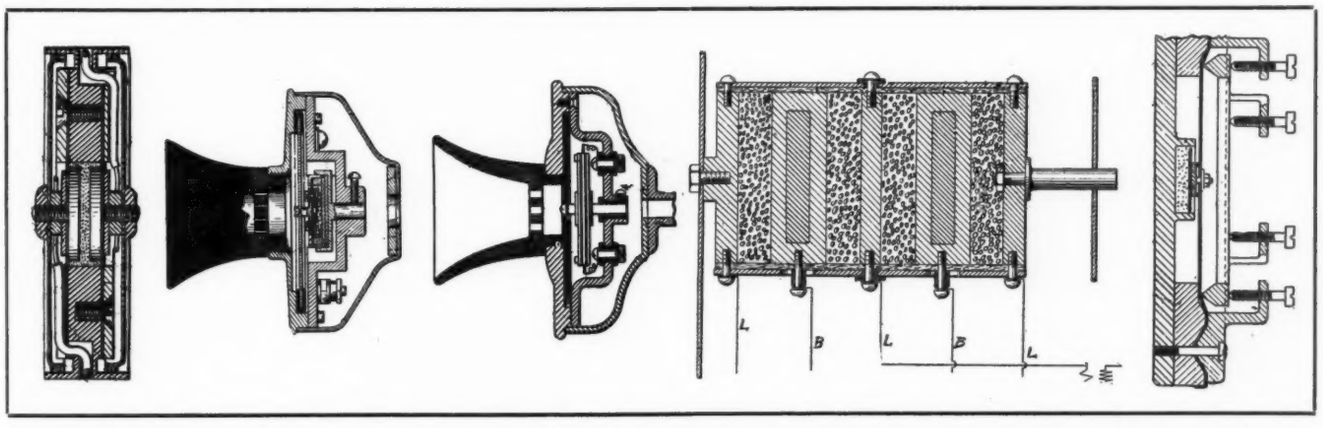


**Types of Receivers Upon Which Patents Have Been Granted—All Are Based Upon the Magnetic Theory.**

It may happen that a wireless inventor, rather than a telephone expert, may be the one to blaze the way to a new opening in the telephone art. A particularly bad feature about having only one substance to fill the most important place in an art, is that it limits it to the whims of one substance, as well as to the possibility of a trust being formed to control its output. If the periodic law of chemistry gives an indication of the substances which are applicable, more or less, to the purposes of a transmitter, the substances would be the following element or their compounds: Silicon, titanium, zirconium, cerium and thorium.

It seems hardly necessary to refer to the inducements to invention along the lines referred to. A few million dollars is one of them; an enviable prestige is another, and there are many others which are apparent to all who have given the subject thought. The possibilities at the present time of obtaining fundamental or basic patents on such lines are great, and therefore they, or others of more practical value, are worthy of consideration and investigation by all who have an interest in telephony sufficient to obtain new principles to use in the art, instead of using the ones which are practically time-worn now. When a series of such inventions are obtained, it will make possible, that which is almost a necessity now, the ability to talk across continents and under the ocean. It will have to come, and if a telephone man will not discover it, it will very likely happen that a tailor or a person of a similar unlogical occupation will produce the invention, even as was done in the beginning of automatic telephony.

The expectations of obtaining desirable results are, at this time, exceptionally bright, and if we may judge the development of the art, in the light of progress which is taking place in other arts, it will be but a short time before inventions such as are desirable in the telephone art, will be placed in the files of human knowledge. Then, as about many other things since the time of Columbus, it will be said: "Why was that not discovered before?"




Different Styles of Transmitters Have Been Patented, but Their Operation Is Based Upon the Pressure Resistance of Carbon.

### Mexican Trouble Starts by Telephone.

President Wilson had gone to bed Monday night, April 20, while the Senate was debating the joint resolution to approve of the use of the army and navy, and the President had determined to withhold action until the resolution passed, although feeling that in an emergency the executive had ample authority to act, says the Telephone News.

At 4 o'clock Tuesday morning Secretary Bryan received a cablegram from Consul Canada, telling of the approach of a German vessel with a tremendous cargo of ammunition for Huerta.

Mr. Bryan telephoned Secretary Tumulty, who decided to awaken the President. He telephoned the White House. The servants were timid, but Mr. Tumulty insisted.

Finally the President came to the telephone, and while Secretary Tumulty was explaining the situation Secretary Daniels called up and was put on the same line. He too had a dispatch about the ammunition. Rear Admiral Fletcher had sent a wireless that 15,000,000 rounds of ammunition and 250 machine guns would be landed from the German vessel by noon that day.

The President listened in silence.

"What shall we do?" asked Secretary Daniels.

"Tell Fletcher to seize the custom house," replied the President, without hesitation.

"Good night," said the Secretary. The telephone conference ended and in a few minutes wireless dispatches were on their way to Rear Admiral Fletcher. He received the message at 10 a. m., and an hour later American marines had landed and taken possession of the custom house. The ammunition will go back to its shippers in Germany.

### National Association Invites Companies to Join.

The National Independent Telephone Association, having offices at 527 Colorado Bldg., Washington, D. C., and 1404 McCormick Bldg., Chicago, has sent out a letter to practically every telephone company in the United States, pointing out the advantages of membership in the association.

The Washington office of the association was opened in order that the Independent companies might have someone with a knowledge of the telephone business, stationed in Washington to represent their interests before the Interstate Commerce Commission and the Department of Justice. Independent companies are offered this representation by the association as one of the advantages of membership, no extra charge being made above the annual membership fee of $10 to companies having over 500 subscribers and $5 to companies having less than 500 subscribers.

The letters sent out by the association are accompanied by a form for membership application, a blank designation of agent form, and a circular describing the Interstate Commerce Commission's control over telephone companies.

### Mountain States to Re-employ Men Who Enlist.

The following bulletin has been sent to the heads of the departments of the western division of the Mountain States Telephone & Telegraph Co., by A. H. DeNike, division general manager:

"Should any of your employes leave on account of conflict with Mexico, you should give them a furlough so that their service record will not be impaired, and assure them of positions on their return. Any persons you employ to fill vacancies will, of course, have to understand that their positions with the company are temporary only."

On account of this order, the pension claims of the employes who may go to war will not be invalidated.

# A General Manager's Advice to His Exchange Managers

**A Comprehensive and Practical Resume of the Elements Which go to Make up the Quality of Service Required of Local Telephone Managers—Paper Presented at a Meeting of the Managers of a Large Independent Telephone System—Final Installment**

By P. Kerr Higgins
*General Manager Texas Independent Telephone System*

There must be absolute co-operation and mutuality of interest between the different sections and departments of our business, otherwise our revenue is likely to be affected. Your interests are not different from that of the company as a whole. They are absolutely one and the same thing. If you are not willing to subordinate your individuality and work with your team-mates along each and every line, then you are not working to the best interests of the company and yourself.

### Direct Benefits of Co-operation.

I am satisfied that if we can obtain the inside and outside co-operation we should have, that we can cut down our expense per station at least 10 cents per month, which would enable us to increase our dividends to stockholders and raise the salaries of employes. Friendly co-operation between department heads, between managers, and between chief operators promotes and develops similar co-operation between all other employes all along the line. If there is an unfriendlines between the officials, it is quickly noted by the employes and they feel justified in fussing with each other, either over the line or in whatever part of the work they are engaged. It is strictly up to you, Mr. Manager, as to whether or not we are having the co-operation in your exchange that we should have and you are the man who must and should shoulder the responsibility. We don't expect any of you to admit your failure to co-operate. We all say that we are working for the company, but too frequently it ends with talk and we fail to actually do the thing that would foster co-operation.

Close co-operation between employer and employed will eliminate the loafer and permit the worker getting what is due him, which has not been always possible in the past. I find many employes splendid writers and talkers, but when it comes to actual demonstration they have nothing to show.

The department meetings which are being held at regular intervals is one of the best helps towards efficiency and is bound to develop in time, if not immediately, a getting acquainted spirit and friendly co-operation with each other, which can be obtained in no other way. We are looking forward with considerable anticipation to the combined meeting of the departments and believe that it can have but one result, an increased tendency toward absolute co-operation between departments.

It is no excuse that you do this or that because the other fellow does it. We want to go not only 50 per cent. of the way towards co-operation, as many of us say we do, but to go at least 51 per cent. The percentage that counts is after you have passed the half way mark. The fact that someone comes to you, telephones you, or writes you a letter with a grouch, is no excuse for you to retort in kind, for if his action was wrong and displayed a weakness on his part, then your action would be doubly wrong. It has been said that a chip on a person's shoulder is liable to make us think that it fell off a blockhead. Don't go around carrying a grouch. You are not employed to scrap, argue and fuss but rather to conciliate and show a friendly disposition towards the company, your associates, the public and yourself. It is usually the fellow who is wrong, or who has no confidence in his own attitude, who finds it necessary to lose his temper in dealing with a second party.

One manager should not criticise another manager, from which follows that one employe should not criticise another. It is such criticism that produces non-co-operation. Let us not consider, then, so much what the other fellow does, as what is right and proper for us to do, regardless of what our position may be in the company. No matter what your position or work is, nor with whom you are dealing, be dignified, tactful and businesslike; and in case of a difference, always remember that possibly the other fellow may be in the right. Carry out this idea not only in the letter, but in the spirit, remembering always that "A soft answer turneth away wrath," and "Politeness is to do and say the kindest thing in the kindest way."

Material is money. I wish you could carry this thought away with you, and keep it continually before you until it becomes a habit and you will be very much surprised at the results. When you are asked to buy supplies or they are sent to you for approval, if you had to dig down into your own pocket and dig up the cold cash, instead of signing your own name and spending another man's money, would you not give the matter more consideration? It is so easy to make a requisition for additional help or additional material, that you seldom think how much this involves and whether or not the additional help or material could be done without.

We believe that if you had to dig down into your own pocket it would be pretty near a last resort to ask for that help or that material. We wish to emphasize the necessity of a little more consideration and care on the part of managers along this line, for the reason that when the general office has to cut out a requisition or additional help, it is really a reflection on the judgment of the manager in making such a request. Before applying for additional help, study and see if you cannot eliminate some unnecessary work being done by your present help. As a rule you do not always know just how much can be done and just how much you can save.

Promotions should be made upon merit only. Anticipate advancement and do not wait until it is asked for. It is too late when you are told he has another position in view paying more money. If you accede to his wishes this time, he will bluff you and pass it on down the line.

Never refuse to re-instate an employe simply because he has previously resigned. It is human nature to be on the lookout for something better and the pasture beyond always looks best, so frequently it is a good thing for employes to go away a while and come back. They usually think twice before they act next time. He is more liable to be immune from discontent thereafter than the "stay at home." He may, and usually does, do some good missionary work for you among your employes, provided always he is the right sort of an employe and we are the right sort of employers.

### Selection of Work.

It would be well for each one of us quickly to think over and carefully decide for ourselves as to which part of the organization we will best fit into, the leaders or the rank and file. Don't let us fool ourselves; we may bluff through for a while but it will eventually come out and end in disaster. The other side is that most of us can and will make good ex-

ecutives if we only apply the knowledge we possess and mix it with a little common sense. In other words if our executive practice is not yet strong enough, let us strengthen it by constant practice and an eternal vigil as long as breath lasts in our body.

It should be a source of considerable satisfaction to all of us to know and feel that this company and its officers think so well of us as to appoint us as custodians of so valuable a property and it should and must be our duty to guard its interests at all times and in all places under any and all circumstances.

The manager is the representative of the company and if he would stop for just a moment and consider the honor conferred upon him and the confidence placed in him by the company in putting under his care and supervision a plant valued at tens of thousands of dollars, he would be more apt to try to meet the expectations of its officers.

If managers would appreciate this honor and assume this responsibility, then there would be no need for organized movements, petitions, etc., on the part of patrons. A manager in the fullest sense of the term, will impress the public with the idea that they have someone whose interest is local, who understands their needs and will do for them the very best possible. He should be a man of heart as well as mind, having a pleasing personality, honest, and if possible having experience to guide his judgment, and not depend too much on inspiration. He should be fully equipped to perform the duties of manager, with a ready answer to all telephone queries and be in touch with a quick source of supply for answers beyond his authority. He must know what he is talking about, and if possible be willing to personally endorse what he advocates. If he does not understand or approve the policy of the company, he must not make it known to the public, because after all it may be ignorance or denseness on his part.

### Latitude of the Local Manager.

It is our intention to give the manager as much latitude as we think he is capable of using to good advantage on behalf of the company. It is our intention to handicap him as little as possible with requirements for special authority, but we must first know that he is worthy of this confidence. It is well for the manager to be a member of commercial organizations and he should endeavor to keep as close as possible to the controlling factors of the local community, securing their friendship in honorable ways. He should be the optimist of the local force and thus radiate to his subordinates good cheer, which dispels the possible gloom due to petty annoyances and irritations of business life.

Promises made in the company's name must be made good. Hence the manager must be careful in making any promises and carefully consider the facts before deciding. If an error is made it is our funeral and must be settled among ourselves without the knowledge of the public. All departments must work in harmony. Confucius, as far back as 500 B. C., said that man is by nature virtuous and that only good examples are needed to make a whole people good. This applies equally well to our organization; hence managers and department heads must be an example to those under them. Confucius also said that you should not do to others what you would not want them to do to you. Pretty good rule to go by, even if it is the negative of the Golden Rule: "Do unto others as you would others should do unto you."

If the needs of a special case demand temporary treatment, it should be applied after a careful study of all the condition and great care taken to isolate the case that the general policy may not be affected. Report all the facts at once to the officer in charge of the department. It must be remembered that such temporary treatment, if it risks the final issue, is very doubtful and should be avoided whenever possible.

This system is not a machine; it is human, for the reason that every employe is to all intents and purposes the company in the eyes of the public, hence honest, courteous, considerate treatment, prompt remedy for existing errors, and equitable adjustment of each and every complaint, reasonable rules and regulations and the impartial enforcement of them, spells a broad acceptable policy and are the standards with which we want our employes credited. Not only must our policy be honest but it must be honestly carried out. Again we must identify ourselves with the community and not as a foreign corporation, hence we must always respect local business methods and practices and be ready to assist in any legitimate manner, the growth of the community, anticipating its needs in the way of telephone service, etc.

Nothing must be done in a prefunctory, indifferent, patronizing, "Don't care" manner. Cultivate the art of being sincere in all your acts and it will cover a multitude of sins. We desire a reasonable amount of publicity, hence we should keep our local editors posted as to what we are doing in the way of improvements, etc. Have him call and see your office and get him interested in what we are doing to furnish the best telephone service possible.

In the writing of letters great care should be taken to avoid antagonizing patrons. Place yourself in the position of the subscriber and then read what you have written. If you must write a letter when you are "peeved," and out of sorts, do so, but please don't send it until the next day. You will be glad I told you this little secret. Assume always that a patron has just cause for complaint. Don't make your letters cold, indifferent, callous, and blunt. You are the very one who would resent such a letter sent you. I have seen such letters sent out, not only by our managers but heads of departments, and they call them business letters. I guess they are; but they certainly are not business getters—there is a difference.

Our first service rendered is usually with the wire chief or chief operator and their attitude should be that of a welcome suggesting cordiality, so that the first impression may be a satisfactory one. The habit of having the chief operator, or clerk in large exchanges, call a number of patrons each day and inquire as to the service rendered has a splendid effect upon our patrons. Some traffic managers object to this but they do so from a traffic and not a commercial standpoint. In smaller exchanges, and even in the larger, managers should systematically call on subscribers, a few visits being made each day.

Our bills and applications for service (contracts) should be as simple as possible and made up so that they are easily understood. We should also urge patrons to visit the central office and special invitations should be extended to women's societies and clubs through their presidents or secretaries.

In making collections, the only safe policy is a definite routine, tactfully and equitably carried out. The bill should be paid when due as only in this way can cordial relations be maintained. The subscriber who won't pay a small bill, stands a poor chance of paying a large one, hence the reason for so many rebates, which in most cases are due to old age. You cannot, as a rule, make friends by loaning money and that is what we do when we allow subscribers to fall behind with their accounts. I do not believe in stereotyped written notices, even at the risk of uniform treatment. I wish to emphasize the necessity for personal contact. A verbal explanation is always better than a written one, provided tact and courtesy are kept in mind in both cases. A personal call frequently softens the collection routine, when all other methods fail. If this cannot be done in person, use the telephone.

We usually get what we give, hence if we wish fair treatment, let us give fair treatment.

I believe we all know enough to be good efficient man-

agers, if we would only apply this knowledge in everyday practice; hence many, if not all these remarks are mere reminders, in an effort to have us re-consecrate ourselves to duty as we know it. The conservation of the individual is only preliminary to that of the management as a whole. The waste of time is not so noticeable as material. Be on the lookout for short cuts, avoid awkward, inefficient, ineffective, and ill directed movements. The object of system should always be to develop good employes. Use science and not hit and miss. Every question has its answer—find the answer. Aim for harmony, not discord; co-operation, not individualism; maximum, not limited efficiency.

The following is suggested as a means of improving the present hit and miss methods:

1. Select, train and teach the employe.
2. Co-operate with the employes so that they may co-operate with you.
3. Fix definitely the responsibility of each employe.
4. Deal with employes individually.

Overinspection is a good thing, one employe checking another. It is also well for managers to plan their work each day; then work out their plan. It develops the system habit and conserves the memory.

Maximum success must be for both the employe and the company; it means increased wages for the employe and increased dividends for the company—a mutual pleasure.

The employer seeks low cost, the employe high wages; hence we must aim at maximum efficiency at minimum cost.

There is a one best way of doing work, one best method and a one best tool and these can only be determined by careful study. It is the duty of the employer to determine how long it should take to do a given piece of work and hence it will be one of our objects to determine standards by which we may in all fairness judge employes. Much of this data is now prepared and the answer is liable to be put into use anytime. There are two kinds of lazy people, the natural loafer and the systematic loafer, but only one recognized kind of laziness.

### Self-Culture.

The subject of self-culture is always an interesting one to the man or woman who is anxious to make good. That employes differ so greatly, as measured by success, is not that any one knows so much more than another, for we have all had pretty much the same experiences in life. It is rather the use made of this experience that accounts for the difference; hence it is in our power, if we will, to train ourselves to benefit by these experiences, and to emulate and practice the virtues or characteristics by which any one succeeds rather than to envy him that success. Nothing has been achieved worth while without effort and it is necessary for us to do our part if we would participate in the prize drawing of life. To do this we must necessarily study, first, ourselves; second, our environment; and third, those with whom we are associated or come in contact.

Too little attention is paid to the development and cultivation of our individual selves. We are paying much more attention to our business affairs, our automobile or something of a physical nature, neglecting absolutely the development of our individual selves.

Self-culture contemplates the development of concentration, the art of keeping our minds from wandering in every direction. In other words, our brains must become absolutely the servant of our mind and this can only be done by constant practice and concentrated effort on the part of the individual. The highest efficiency can not be obtained in life unless our minds are properly disciplined and one of the first things to teach it is obedience and the habit of concentration. The possessor of such a mind will find unlimited chances for success. It has been stated that no genuine success can be obtained without a good moral character, and character is the sum of our habits of thought put into execution. It is true that early formation of habits of thought make us predisposed towards certain things and it should be our practice to analyze these predispositions, sifting out the bad from the good, ignoring and expelling the bad and developing and cultivating the good.

Strive to confine each day's activities to that particular day, thus conserving vital energy and avoiding worry. We will make mistakes, but each mistake should teach us to avoid them in the future, hence while reaching out for some objective and finding it impossible to obtain, by shifting our position and attacking the problem from another angle, we may ultimately win success.

Another thing is to strive to know definitely just what we want. It is certain that a large majority of our ambitions are never realized at all, in that, even after realized, most of them are fruitless and undesirable, proving that owing to the lack of proper brain control, we are wanting in the necessary perception to guide our efforts correctly.

Ambitions are a good thing but we should seek to develop only those ambitions that are really worth while. We are always seeking after happiness but we often confuse happiness with finances. Money never will bring happiness and is not necessary to happiness beyond what is required to keep us in comparative comfort. All happiness and contentment comes from within. It is a state of mind not pocketbook, hence the necessity for spending some of these elements in building up our mental capacities, striving to obtain control over our instincts.

If we are to have proper self-possession and contentment, our aim should be to always spend less than we earn. It is always easier to cut our expenses than to raise our income.

All of the above reminds us that there is within each one of us practically equal material out of which to work success, if we only strive to develop ourselves. Some have a slight advantage through early training, but even this can be overcome by proper care and thought in training our brain. It is our duty to our company and especially to ourselves to make a special effort to secure control over ourselves and if this company were manned by employes who had reasonably good control of their minds, the company would be made up entirely of material fit to become general superintendents, general managers and presidents.

*(Conclusion.)*

### Telephone Rate Situation at Crawfordsville, Ind.

Members of the city council and of the commercial association of Crawfordsville, Ind., say they will see that the matter of increased telephone rates as proposed by the Central Union Telephone Co. in their city goes before the Indiana Public Service Commission, since the company refuses to compromise its proposed rate schedule with the city.

Committees from the council and commercial body met with the telephone company officials in Indianapolis a few days ago and returned to Crawfordsville without accomplishing anything. According to the city of Crawfordsville when the telephone company filed with the state commission a schedule of the rates it was charging preceding Jan. 1, 1913, it placed the figures higher than they actually were. The city charges this was done with a view to an increase later to conform to the schedule filed.

Crawfordsville therefore now will contend the Central Union should file a schedule of the rates prevailing at that time, and then, if it wishes to increase, file a petition with the commission to change the schedule. The burden of placing the matter before the commission would then be upon the telephone company. The city would rather it be this way than that it should have to ask the commission to lower the rate. The Central Union absorbed the old Home Telephone Co. at Crawfordsville some time ago.

# The Rejuvenation of the Craneville Telephone Exchange

**A Serial Story Telling How a Rundown Telephone Plant Was Rebuilt, Enlarged and Changed Successively from a Grounded to a Local Battery Metallic System and Later to Common Battery —Problems Encountered by Every Practical Telephone Man**

**By Paul Hamilton**

P. J. Rankin met with unexpected success in the installation of a power plant at Three Forks. Local capitalists were at first skeptical, but when it became known that outside money could be secured almost for the asking, Rankin found no difficulty in disposing of his stock offerings. The Craneville Light & Power Co. was at first inclined to fight Rankin, but its officers were finally convinced that a merger plan would be more satisfactory.

When the plant at Three Forks was finally placed in operation, the demand for light and power was unexpectedly large. Still the possible supply exceeded the demand; that is an increased output of say 50 or 75 per cent. could be obtained with a very small increase in investment and operating expenses.

Mr. Barrows foresaw the effect upon the three former lines he now had in operation, as well as a few remaining grounded lines in the Craneville district. The matter came up for discussion at various times.

"There ain't anything we can do to prevent putting noise on your lines, is there?" Mr. Rankin inquired.

"Nothing that I know of to prevent it. Of course, it can become more intense and annoying due to unnecessary leaks through poor insulation causing ground connections."

"Well, when anything of the kind comes to your notice, or if there's anything we can do for you, let me know. By the way, here is a movement on foot that may interest you.

"We are looking for an outlet to get rid of some of our surplus power. We have finally employed a promoter to try to bring some manufacturing plants here. There seems to be some prospect of getting a shoe factory, a pipe factory, a wood pulp concern, and a glass factory. The outlook is so good that a movement has been started to put up an office building, six stories or so in height, across from the postoffice. Of course, that is looking a good ways ahead. It is a pretty central location, and if we can get two or three good leases, we will go ahead. How about laying out quarters for a telephone office and exchange?

"If it goes through, I'm going down there and this shack will have to come down sooner or later. That is one reason I haven't urged a long lease. There's also been some talk of getting your poles off of Main street. You've heard of that I guess. We can hold them off until you can arrange plans to move the exchange. They want the wires underground. Don't think I'm trying to force you into the deal.

"As I said, we want some permanent tenants. If you conclude to occupy a floor, or part of one, the architect ought to have the necessary information to provide anything special you may require and save cutting the building to pieces later on. Think it over and let me know. Maybe there are some concessions you can get which would make the change worth while."

The information conveyed by the liveryman had a vital relation to the telephone situation in Craneville. During the year, what had appeared to be about the extent of the business in Craneville proper had been reached. A study of future growth under conditions which had existed was unnecessary. There had been little possibility of a large increase in population. With 500 stations now in service, an additional hundred would be an optimistic estimate for growth during the next five years. Mr. Barrows was already considering reducing expenses by releasing Germany to the brick company, which would be a gain in operation.

Under present conditions, his estimates of the telephone plant value was $6,250. From this investment he derived a gross income of a little more than $13,000. The fixed charges were estimated as follows:

| | |
|---|---|
| Labor, for maintenance and operation | $3,300 |
| Rent | 300 |
| Light and heat | 250 |
| Insurance and taxes | 350 |
| Depreciation reserve | 700 |
| Interest on investment | 500 |
| Total | $5,400 |

While the margin of gross income over fixed charges appeared to be ample, owing to changing conditions, obsolete equipment and the methods required, a certain amount had to be re-invested in the plant. The farmer lines, for instance, would have to be cut metallic in the near future; cable would be needed to replace open wire in many places and along the main street the cable would have to be placed underground.

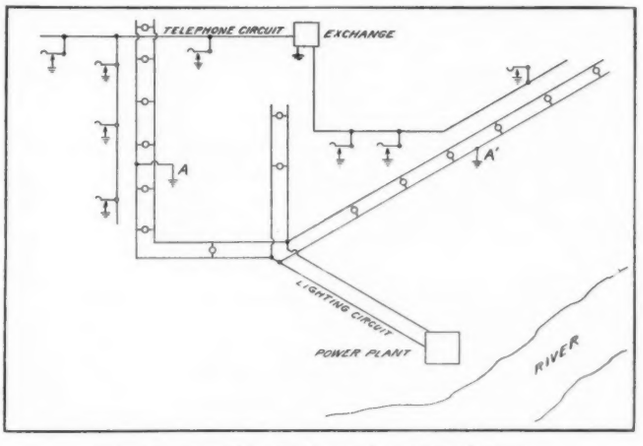



**Fig. 87. Possible Paths of Least Resistance.**

The expense of such changes in the plant, while only increasing the earning capacity to the extent of reduced cost of maintenance, would add but little to the investment. The value of the plant recovered would not equal the increase in the cost of new material over the original installation. Much of the latter, while still serviceable, would be useless and worthless after removal.

With the new outlook for rapid and quite extensive growth, the situation was entirely changed. The coming of manufacturing interests on account of cheaper power to be supplied from Three Forks, placed an entirely different aspect upon the telephone situation. It made serious reflection advisable on Mr. Rankin's suggestion to seek new quarters. It meant also consideration of changing the system to common battery when the removal of the exchange should be made.

When the men came together at the exchange in the evening, Mr. Barrows had no particular subject in mind for discussion. Frank, however, suggested one when he said:

"I overheard you say to Mr. Rankin that the electric light

noise would be worse if there were poor insulation between the wires and the earth. I've been thinking about it and can't get it through my head how it is."

"We discussed the induction problem once, I believe, in a general way," answered Mr. Barrows. "I didn't expect we would ever get into the difficulties we are facing now. Of course, our trouble is with the farmer lines, which are now in the electric light field. Eventually they will have to be cut metallic.

"It is like this (Fig. 87). The lighting circuits nowadays are usually grounded at the transformers instead of at each individual house, as we do with our telephones. These grounds are for protection primarily, but there is a chance of their becoming slightly crossed with one side of the circuit. There is also always the probability of the lighting circuit becoming grounded through trees, etc. Presuming there should be grounds through trees at points $A$ $A^1$ (Fig. 87), our telephones will pick up the stray current immediately whenever a receiver is removed from the hook, as a path of lower resistance is then provided.

"One ground on the lighting circuit is sufficient to cause trouble. It is sometimes very difficult to convince the lighting people that a ground of too high a resistance to affect their lights will affect the telephones. In fact, they will often claim that there is no ground on their system, but are usually convinced if a ground be placed on the opposite side of their circuit, thus forming a short circuit and blowing their fuses.

"In this sketch (Fig. 87), you can find several paths for the current, of which our lines can easily form a part.

"We know that our receivers respond to variations in the current flow. Even now we hear a steady hum, which is caused by the frequency or alternations of the lighting machines."

"How about induction not caused by grounds?" the Doctor inquired.

"That, of course, is another thing. We probably won't experience much trouble from parallel lines, as the lighting company will use the opposite side of the road from us. There would be a chance if we were parallel for an extremely long distance. If we could overcome the ground noises, the aerial conditions would not worry us to any great extent. We discussed that feature some time ago, I remember."

"That telephone out at Cooper's place don't ring good and we don't hear very good over it," said Germany.

"That is the place on the hill just beyond the stone quarry, isn't it?"

"Yes, by the stone quarry is the place."

"I presume your trouble is in your instrument."

"I hardly think so," said Frank, "as we tried out two and neither would come up. The other one we put in at Ryan's place and it works all right."

"I guess I'll ask a few questions then," concluded Mr. Barrows. "Now, Germany, what is necessary for one of those bells to ring?"

"I know, but maybe I don't know how to tell about it. You hook him up to the little posts and fix the armature and the clapper and then you have him."

"That may be all right, but it doesn't quite bring out the condition clearly. What would you require, Frank?"

"Well, I suppose that the bells should be properly adjusted is the first thing and then about as Germany says."

"But with that, don't you require one other thing? Now, think a minute."

"There's the generator?"

"That is not required at the telephone where you are adjusting the bell. It is used only in calling out. Of course, it is in the circuit and we ring through a shunt, but if that shunt were open and you were ringing through the armature winding, the bells would work the same in both places. Your trouble must be purely local, some physical deficiency peculiar to Cooper's place."

"There isn't anything we use there but the ground," said Frank.

"Well, doesn't it look as if that were your trouble? I doubt if you have a good ground. That hill is a little dumpling of solid rock. The soil, I imagine, is pretty dry and hard. The rock is flinty and not porous, as limestone might be. In its present condition, it is probably about as near a non-conductor as it can be. The soil above it is almost as bad, as it is so hard it does not absorb moisture from rains. Isn't there a well near the house?"

"No, but Cooper has a gasoline engine with a pump connected to a pipe line from a well down at the foot of the hill. He's going to get a wind mill."

"Suppose then your ground is bad! How are you going to prove it?"

"I suppose we can take a ground from that pipe line," answered Frank.

"You might try that, but would you give it up if that failed?"

"I don't see what else we could do. That pipe surely isn't open."

"Not for carrying water perhaps, but carrying electricity is different. There may be rusty joints in that pipe line to offer resistance to the flow of electricity. It wouldn't be safe to use it for a permanent ground anyway, because it is liable to be opened at any time for some purpose and leave our telephone out of service."

"We'll try that plan to see if our ground is bad," said Frank.

"That is the idea. If you find that to be the case, you will have to run a ground wire out along the loop and down the line past the quarry and set a regular ground rod at the foot of a pole.

"If the pipe doesn't show any difference, what shall we do?"

"Try it with the pipe full of water. If that doesn't make any difference, take a wire down to the low ground and set a ground rod temporarily. But I think the pipe will answer your purpose."

*(To be continued.)*

**Further Hearing in Pennsylvania Investigation.**

The Bell Telephone Co. of Pennsylvania continued the presentation of its case in the Pennsylvania rate investigation at a hearing held at Harrisburg recently. H. A. Trax, assistant commercial engineer of the company, introduced a detailed statement of expenses and gross revenue for the last three years.

F. B. H. Paine, of New York city, an expert on appraisals, engaged in several interesting discussions with both ex-Governor Pennypacker and Prof. Emory R. Johnson. Mr. Paine's analysis of the Bell inventory added $207,000 to that presented for the company at the opening of the case. Mr. Paine explained in detail various percentages which he had added to the inventory.

**Municipal Ownership Test Vote for Des Moines Iowa.**

Voters of Des Moines, Iowa, will be asked to decide at the primaries in June, whether they favor a municipal telephone system. The move to submit the matter to a vote was started at a conference between Mayor Hanna, and several Des Moines business men and which was attended by Harold D. Stroud, of Chicago. The business men's committee has been working on the municipal ownership project for some time. If the voters express themselves as in favor of the municipal project, it is proposed to use this as a means of inducing the state legislature next winter to enact a law permitting municipal ownership of telephones.

# Queries on Theory and Practice

### Resistance in Transmitter Circuit.

As .2 ampere per zero loop is required of a cord circuit to give satisfactory long distance transmission, would not a circuit using two 50-ohm relays (100 ohms) to supply transmitter current at 22.5 volts do the work as well as one using two 100-ohm coils (200 ohms) and supplied with 42.5 volts?

It all depends upon the telephone set which you are using. There is a resistance of a telephone set which will give you 0.200 ampere under both conditions which you mention. It is 12.5 ohms.

$$\frac{22.5}{12.5+100} = 0.2 \text{ amp.}, \qquad \frac{42.5}{12.5+200} = 0.2 \text{ amp.}$$

Usually the resistance of the complete telephone set will amount to 50 or 100 ohms, and sometimes even more. The current will be correspondingly reduced.

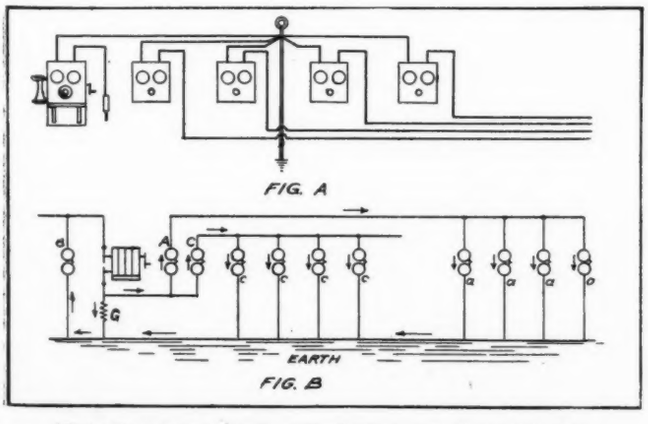
| | Current (zero loop) | |
|---|---|---|
| Telephone resistance | 22.5 volts | 42.5 volts |
| 12.5 ohms | 0.200 ampere | 0.200 ampere |
| 50.0 ohms | 0.150 ampere | 0.170 ampere |
| 100.0 ohms | 0.112 ampere | 0.142 ampere |

The low voltage system suffers a greater reduction in current than does the high voltage system. This holds true also of increased lengths of subscriber's loop.

### High Resistance Ground Cause of Cross Ringing.

Referring to the accompanying diagram, (Fig. *A*), we have four farm lines entering a farm house, all four being connected to the same ground rod. Why do all bells ring when ringing out? All four bells ring when subscriber rings out, but he gets the party called and does not disturb the bell of his nearest neighbor 500 ft. away. Only one bell rings on received calls. If we connect to separate ground rods, the whole thing clears up. Of course this is not a real case of trouble as it is immaterial whether one or all bells ring so long as the party wanted is rung. It is simply a conundrum to many.

High resistance in the common ground connection is the cause of your cross ringing. The current from the hand generator goes to earth through the ground rod contact resistance *G*, (Fig. *B*), and returns by the bell *B*. But part of the current leaks around through the bell *A*, and all the bells on its line to earth, back to the ground rod of bell *B*. It leaks through




High Resistance Ground Conditions and Cross Ringing.

all the bells (as *C*) and their other line bells in the same way. If *G* were zero, no current would be diverted through *A* and *C*.

The other bells (*aa* and *cc*) do not ring because they are in parallel with each other and so many in number. The current through bell *A* is just about enough to ring it, but when divided up among so many bells (*aa*, etc.), there is not enough in each bell to ring it. If you were to cut off all the other bells but one, the chances are that bell *A* and the one other would ring slightly in series.

### A Tap on a Phantom Circuit.

The accompanying diagram (Fig. *A*) shows two metallic lines running parallel from Utica to Croton with one telephone bridged to one of them. We want to phantom the circuits from Utica to Croton and still leave this telephone tap on at Homer. Can it be done? If not, could you suggest some way of doing it?

If the tap is a short one, you can leave it as it is with no detriment to the phantom. The only way in which the tap will harm the phantom is to unbalance it because of the leak-

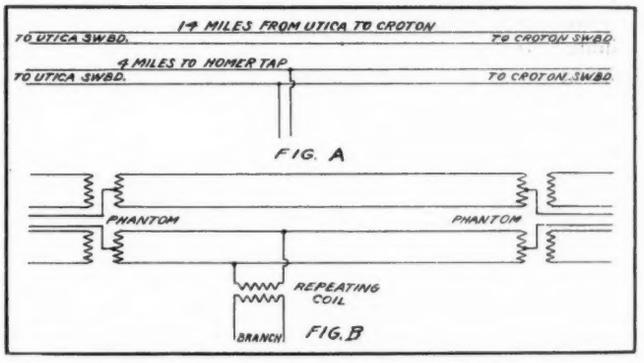



Diagram of Phantom Circuit with Tap.

age or capacity of the tap, to earth. To make sure, the tap can be separated by means of a repeating coil as shown in Fig. *B*. The telephone on the branch (tap) will ring and talk through two repeating coils, but this should not interfere with the service if the coils are good ones.

### Grounded Circuits and Lighting Leads.

We have a lead of telephone wires, running along a 30-foot public road, carrying two metallic and three grounded lines. Two and one-half miles out, one metallic and one grounded line leave the road; the other continues. Our wires are on the west side of the road except for about a quarter of a mile, four miles out. The electric lighting company is now constructing a bare wire circuit on the east side of this road to go out 4½ miles. This high power current parallel to our lines will be 22 to 30 feet distant, except for the quarter mile we are on the east side, at which place it will be six to 10 feet away.

Under these conditions what will this 2,200-volt current do to us? Will it put us entirely out of commission? What shall we do for protection?

The 2,200-volt alternating current will cause great noise on the earth return circuits. Predicting the exact amount is difficult. The least you can do, is to move your lead across the road away from the power line for that quarter mile where you are now so close. Your metallic circuits will be all right, if well insulated and transposed. The ground return line may have to be made metallic. It is doubtful if you can use them with satisfaction after the power is turned on.

### Independent Association of America Convention Report.

The report of the convention of the Independent Telephone Association of America, held in January, has been published in book form and is ready for distribution. It is being mailed, without charge, to the member companies and will be furnished to non-members at 25 cent per copy.

# Proceedings Before Commissions, Courts and Councils

**Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service**

### Telephone Hearing at St. Louis.

At resumed hearings last week before the Missouri Public Service Commission the Southwestern Telegraph & Telephone Co. continued the presentation of its case in behalf of higher telephone rates in St. Louis and vicinity. Attorneys for the company sought to withhold statistics from the commission until the engineers had investigated the property and reported. Chairman Atkinson, however, ruled that the burden of proof as to the reasonableness of the proposed reduced rates rested upon the company and that it must present all of its evidence. The commission's engineers will then do their work after which the company will be permitted to enter its objections to the figures of the commission's engineers.

F. O. Hale, chief engineer of the Southwestern company testified that he believed 9.9 per cent. was the rate which should be allowed for depreciation.

In the examination of John J. Robinson, general plant superintendent of the Southwestern company, Commissioner Woerner directed much attention to the value of real estate held by the company. The testimony indicated that the company, in arriving at a valuation upon which to require that a given percentage be earned, included the value of certain real estate which it owns but which instead of being used for telephone purposes, is leased to others.

The valuation of this property was also criticised as being about five times as high as the sums originally paid for it. Commissioner Woerner stated that real estate values were made by the public and that therefore such increased values did not constitute a proper basis for increased telephone charges. He asked the witness whether, in case the property depreciated instead of increasing in value, he would charge on its original cost or its depreciated value. Mr. Robinson contended that the company was "entitled to an earning on all of its investment."

The hearing was adjourned until the commission's engineers and accountants can complete their investigation of the company, and then will be resumed on a date to be fixed by the commission.

A report from Jefferson City, Mo., where the Southwestern Telegraph & Telephone Company's affidavits of valuation for tax purposes are on file with the State Board of Equalization, shows wide discrepancies between the company's figures for taxation purposes and its valuation figures as presented to the Missouri Public Service Commission. In commenting upon this, Chairman Atkinson stated that the valuation placed by the commission on the physical property of public service corporations will be certified to the the State Board of Equalization.

### To Change Telephone Act in Ontario, Canada.

Some important amendments are to be made in the Ontario Telephone Act, a bill to that effect having been brought in by the Provincial Treasurer, Hon. I. B. Lucas, and passed through the committee stage and subsequently adopted by the House. The most important clause is that giving the Ontario Railway & Municipal Board the power to prevent unnecessary duplication of telephone systems. Where a duplication is proposed, the board shall determine whether the proposed added line is in the public interest.

The board is given authority also to regulate the hours of employment of telephone operators. A case arose recently in which two girls were found to be giving a 24-hour service, including Sundays. The board is to have power to intervene to prevent the recurrence of any case of this kind.

In the belief that the board is better qualified to decide on matters in several respects than the cabinet, the jurisdiction of the lieutenant-governor-in-council is transferred to the railway and municipal board of the province under many sections of the act.

Arrangements for interchange of traffic between companies and with municipalities are hereafter made subject to the approval of the railway board, which is also to pass upon agreements for the sale of telephone companies.

A point not clear in the law as it stood has been rectified by an amendment providing that any person signing a petition for a telephone system is to be liable for his share of the cost of establishing the undertaking.

In unorganized districts of the province the telephone companies are to be granted the use of the highways for the erection of poles, stringing of wires, etc.

### Mountain States Seeks Supersedeas From Ouster Ruling.

The Mountain States Telephone & Telegraph Co. has made application to the Colorado Supreme Court for a writ of supersedeas from the recent decree of Judge Dennison requiring the company to remove its poles and wires from the streets of Denver within 90 days. The application was resisted by a representative of the district attorney's office.

### Antitrust Legislation at Washington.

The judiciary committee of the House of Representatives, at Washington, D. C., has ordered favorably reported its omnibus bill designed to cover the administration recommendations for antitrust legislation, and the rules committee met this week to pass upon a rule covered in a recommendation of Chairman Clayton of the judiciary committee to expedite the passage of the measure. The bill is mainly the same as when introduced less than a month ago as a revised combination of separate bills on holding companies, interlocking directorates, etc.

### Valuation of Utilities in District of Columbia.

The Public Utilities Commission of Washington, D. C., expects to make a valuation of the various public service corporations operating in the District of Columbia. According to the plans under consideration the work of valuation will be under the direction of Prof. Edward W. Bemis, of Chicago. Congress appropriated $100,000 for the expense of the valuation. Although the date of July 1, 1915, is set for completion of the work, it is not believed that so much time will be required. Prof. Bemis is to make reports to the commission of his progress each month. His staff will consist of a chief engineer, a chief accountant and other employes. Several properties are to be valued, including the Chesapeake & Potomac Telephone Co.

### Southern Bell Announces Rate Increase at Anniston, Ala.

The Southern Bell Telephone & Telegraph Co. has notified the city council of Anniston, Ala., that effective on July 1, it will make an increase of 50 cents a month in telephone rates in Anniston, and that similar increases will be made at Gadsden and other places. The company stated

that it has completely outgrown its present quarters and finds it necessary to spend about $66,000 in Anniston to take care of its increased demands. To do this a new switchboard will have to be built, the building enlarged and much new wiring installed. The company is now making only 5.2 per cent. on its investment, it declares, and expects as a result of the increase to make 7.2 per cent., which the company regards as not exhorbitant.

In pursuance with the company's policy of taking the public into its confidence, the Southern Bell asked the council to appoint a committee to examine its books and make an investigation of its claims. After some discussion this was done. It was brought out, however, that the proposed raise abrogates the discount heretofore given for payments by the 10th of the month and in some instances amounts to a raise of 85 cents per month.

The new rates as proposed will be: Business telephones, $4 per month; single line residence telephones, $2.50; duplex lines, $2, this being the rate charged in several other places of Anniston's size.

**Telephone Opinion by Chicago Law Department.**

The law department of the city of Chicago has sent to Ray Palmer, commissioner of gas and electricity, an opinion containing the following conclusions:

"That the Chicago Telephone Co. does not have the right, against the wishes of the subscribers, to add to its bill for current service under an existing contract, a part of a bill incurred by the same subscriber under a former contract which has been terminated.

"That where service is furnished a subscriber under an existing contract, and all bills incurred under such contract have been paid promptly, the telephone company cannot lawfully discontinue the service on account of an unpaid bill for service furnished the subscriber under a former contract which has been terminated."

**Boston "Free Extensionists" Win Fight for Long Cord.**

As the result of a recent fight by Councillor James A. Watson, of Boston, before the committee on mercantile affairs of the Massachusetts legislature, the New England Telephone & Telegraph Co. has agreed to supply subscribers with enough extra cord so that they can move their telephones to any part of the house or take them to bed with them if they so desire, without the usual $6 charge for an extension set.

Councillor Watson's demand was for the right to use unlimited extra cord and he made a personal plea for 30 feet of extra cord in his own home. He offered to pay for the cord. After first offering various objections, the telephone company not only acceded to the demand of the "free extensionists" but went them one better and agreed to furnish the cord free to any telephone user. To the company's objection that a cord dragging about the house would be a nuisance, Mr. Watson answered that little hooks could be placed about the walls to keep the cord out of the way.

As a result of the company's final adoption of the plan, the housewife can in future have her telephone at her elbow, whether she is in her kitchen, laundry, parlor or boudoir, or a member of the family may set the telephone at the head of the bed upon retiring.

Councillor Watson was backed in his demand for extra cord by Chief William H. O'Brien of the telephone bureau of the Massachusetts Public Service Commission. In speaking of their success in putting the new plan through, Chief O'Brien said:

"I recommended it because times change and telephone service should advance, and telephones must advance, also service. The old-fashioned five feet of cord was all right when telephones were used less frequently. If a man wants to talk from this or that room or from his bed in the attic—why not? The company went him one better and said they would furnish it free to him and all who should apply. I personally think it may be a good business move for the company, and it certainly will be a convenience to many."

**Telephone Rate Investigation in Maryland.**

The telephone rate case in Maryland, one of the most important cases to come before the Maryland Public Service Commission since its creation, is expected to be ready for hearing before the middle of May.

Osborne I. Yellott, counsel for the commission, has been making an investigation of the affairs of the Chesapeake & Potomac Telephone Co., and an inventory of its property based upon data supplied by the company and on the field work of his own assistants, who have had the cooperation of the engineers, accountants and other employes of the telephone company. A great mass of data showing the various contracts and working agreements under which the Chesapeake company is operated and a stack of tables giving the company's valuation of its property was submitted to the commission and have been tabulated and verified by Mr. Yellott, Chief Engineer Phelps and Col. John A. Tompkins, auditor of the commission.

In making the valuation the unit system was adopted. Poles, wires, switchboards and every piece of equipment was valued separately, as was also each piece of real estate owned by the company. The tables prepared for the consideration of the commission show three totals—the valuations of the company, of the chief engineer and of Mr. Yellott.

In presenting the case to the commission Mr. Yellott, with the assistance of Messrs. French and Marbury, representing the Telephone Protective Association, will present tables comparing the Baltimore telephone rates with those in effect in other cities to show that Baltimore rates are excessive. They will also endeavor to show that the 6 per cent. allowed for depreciation is largely in excess of that allowed in other states.

As in the case of rate investigations involving Bell subsidiary companies in other states, the Maryland commission will go at length into the payment by the Chesapeake & Potomac company of 4½ per cent. of its gross earnings to the American Telephone & Telegraph Co., which has received a good deal of publicity in Baltimore recently as a "concealed dividend."

**Proposed New Telephone Franchise for Spokane, Wash.**

C. M. Fassett, commissioner of public utilities of Spokane, Wash., recently submitted, at the request of the commissioner of the city, a proposed 25-year franchise for the Pacific Telephone & Telegraph Co. to take the place of the present franchise of the company which expires in June.

The proposed new franchise provides a new schedule of rates, involving a reduction in both business and residence telephone service charges. It provides for the installation of a complete system of automatic telephones within two years; declares the right of the city to fix rates every five years and the right to take over the system at any time; requires that all wires and conduits within the fire limits shall be underground; that all poles be painted a dark or moss green and the company required to file with the city a map showing its entire system, including the location of all poles, wires, conduits, etc. It further requires that the company shall notify the city as to the details of all proposed extensions and provides that extensions must be made upon order of the council whenever it is shown that

such extensions are "just, fair and reasonable." The company is prohibited from selling, mortgaging or encumbering its holdings without the consent of the city, or from entering into combinations with other companies and is prohibited from transferring stock to other companies.

In a letter to the commissioners, accompanying his proposed franchise, Mr. Fassett advised that the granting of the franchise be made contingent upon the Pacific company securing the remainder of the stock and bonds of the Home company, and this the company has indicated its willingness to make an effort to do. It has been shown that the Corporation Securities Co. owns about 99 per cent. of the stock and bonds of the Home company.

This suggestion of Commissioner Fassett was criticized by Commissioner Fleming, who is opposed to consolidation, favoring instead a physical connection between the two systems.

### Uncompleted Toll Calls Without Charge in Vermont.

The New England Telephone & Telegraph Co. on May 1 abolished in Vermont the reduced rate charge formerly made on toll calls where the party called was not present to answer the call. This action followed a consultation with the Vermont Commission, and is in accord with action taken in Maine, New Hampshire and Massachusetts on April 1. The Massachusetts and Vermont commissions have recognized the reasonableness of the charge, while suggesting that it be abolished on the ground of its being a continual source of misunderstanding on the part of the public. The company has decided to regard the charge as a general expense of the business and hopes that the elimination of the charge may be made up by a freer use of the toll lines.

### Vermont Commission Temporarily Restrained.

Judge John L. Martin of the United States court at Brattleboro, Vt., recently issued a temporary injunction restraining the Vermont Public Service Commission from carrying out its order against the New England Telephone & Telegraph Co. and the Vermont Telephone Co. which required a reduction in multi-party rates. The injunction was issued with the understanding that if the commission ultimately wins out the telephone companies shall rebate to the subscribers such funds as they shall have collected in excess of the rates ordered by the commission. After filing of answer by the commission a hearing will be held on the merits of the injunction case.

### Censorship of Telephone Calls on Nebraska Ranch Line.

If a ranch owner puts a telephone switchboard in his house for the accommodation of tenant farmers living in houses on his land, has he a right to censor calls through such a board? This is a question now agitating the Dawson Telephone Exchange, the management of the Miles ranch six miles south of Dawson, Neb., and the Nebraska Railway Commission. The commission is investigating.

The Miles ranch consists of eight thousand acres owned by Joseph H. Miles, inherited from his father and earned by twelve years' litigation. D. F. Harbaugh manages the ranch. He was formerly a Kansas City detective with a prominent part in the court proceedings in the Miles will case.

The Miles ranch is well improved. It is farmed by tenants living in different houses on the place. For their convenience a telephone switchboard connected with the Dawson Telephone Co. was placed in the old ranch house, occupied by Harbaugh and family. Recently Harbaugh refused to permit a certain physician in Dawson to talk to tenants on the ranch. A complaint has been made to the railway commission and an investigation is being made by Commissioner T. L. Hall. It has been learned that free connection has been allowed the ranch with the Dawson exchange. In addition to deciding the right of censorship it is probable the commission will also rule that the ranch is a farm line and not a telephone exchange and therefore should pay the regular switching charge on all calls. No reason has been given for boycotting the doctor.

### Summary of State Commission Hearings and Rulings.

CALIFORNIA.

Decision No. 1410: Order authorizing the Southwestern Home Telephone Co. to issue notes aggregating $35,050 to refund notes of a like amount outstanding, and to pledge certain bonds as security therefor.

Decision No. 1419: In the case brought by S. O. Fesler, et al. vs. The Pacific Telephone & Telegraph Co., in which it was alleged that the farmer line rates of the Modesto exchange are discriminatory and unjust, the commission directs the defendant to place these farmer lines on a uniform schedule, based upon the $3 rate now charged certain subscribers for this class of service, and if such rate is protested by defendant as unfair, defendant may file, within 30 days an application to increase such rate, stating its reasons therefor. It is held that in future where discrimination is proven to exist and the defendant desires to eliminate such discrimination by raising the lower rate, the burden of proving that the lower rate is unjust shall rest with the defendant.

Decision No. 1413: Order authorizing Yaple & Co. to sell to J. S. Moulton for the sum of $352 the telephone exchange at Ripon, Cal.

IDAHO.

May 11: Date for hearing arguments on the application of the Home Telephone Co. for a certificate of public convenience and necessity to establish and operate a telephone system in the Genesee country in Latah county. The Genesee Telephone Co., the Interstate Telephone Co., and the Pacific Tlephone & Telegraph Co. are permitted to intervene.

KANSAS.

May 14: Hearing at Canton, Kan., on the request of the Canton Telephone Co. for a raise in rates.

MARYLAND.

April 25: Petition by citizens of Crisfield, Md., requesting that the Chesapeake & Potomac Telephone Co. be required to take charge of its lines and equipment now leased to the Pocomoke Telephone Co. and to operate the service as a part of the former system. Alleged excessive rates and poor service are the basis of the complaint.

NEW YORK.

April 27: Answer of Glen Telephone Co. to the complaint of the Gloversville Merchants' Association, in which the company justifies its toll rates between Gloversville and Johnstown.

May 1: Order dismissing the complaint of residents of the village of Weedsport against the New York Telephone Co. in the matter of proposed increase of rates, without prejudice to the renewal of the complaint upon good cause shown at any time the complainants may desire to reopen it.

May 1: Order authorizing the Byron Telephone Co. to issue $10,800 capital stock, to be sold for not less than par, the proceeds to be used solely and exclusively for the reimbursement of its treasury for expenditures from income for capital purposes.

OHIO.

April 28: Order in the case of F. M. Curry, of Minerva, Ohio, vs. the Eastern Ohio Telephone Co., directing the telephone company to supply the complainant telephone service at a rate not to exceed $8; eliminate from its schedule the stipulation that a special contract shall be entered into for any class of service; and ordering the defendant telephone company, if and when it reserves the right to discontinue or refuse switching service to subscribers who have incurred expense in building lines or purchasing material in order to secure such service, or if it reserves the right to change or modify the rate for such service, to show and publish in its schedule the terms and conditions upon which such service may be discontinued, or refused to such subscriber, or the circumstances under which such rate may be changed or modified, and in case of such change, requiring the company to provide an equitable reimbursement of subscribers for the expense incurred.

OREGON.

April 26: Application by Pacific Telephone & Telegraph Co. to close three telephone offices in Lane county because of insufficient revenue and because the places are reached by other companies.

### Earnings of Citizens Company of Grand Rapids.

The Citizens Telephone Co., of Grand Rapids, Mich., has paid a dividend of $57,791 to its stockholders. Accompanying the checks was a statement showing the earnings of the company for the first six months of the fiscal year to January 1, 1914. The gross earnings were $427,684, operating, maintenance and reconstruction expenses, $210,686; taxes, $27,055; interest, $14,846, and dividends, $115,582, leaving $60,062 for depreciation, reserve and surplus for the six months' period, or at the rate of 3 per cent. on the outstanding capitalization.

Comparisons with the earnings for the corresponding period the previous year are not given because the method of bookkeeping has been changed to conform to the regulations of the Interstate Commerce Commission and this makes comparison difficult. The earnings, however, show a very substantial increase and the net above taxes and interest is at the rate of about nine per cent. The company shows a gain of 314 in the number of subscribers for the first three months of the year.

### Clearing Trouble on a Mississippi River Cable.

The Cumberland Telephone & Telegraph Co. recently performed an arduous task in repairing and relaying a portion of its Mississippi River cable, connecting Mississippi and Louisiana wires, the cable having been severely damaged by lightning from the Delta, Louisiana, landing. It was thought on first inspection that the cable was so badly damaged that it would have to be entirely relaid.

Superintendent of Construction Emery, and Superintendent of Toll Lines W. G. Phingstay of New Orleans are credited with having accomplished what is considered by cable men as a great feat of telphone work, in raising this heavy cable from the bottom of the Mississippi river, laying its damaged parts out on a big barge, and there cutting out 180 feet of the damaged wires and replacing them with new cable.

The barge was held out in the river by gasoline boats, while the big cable was hauled up. When the damaged place was found the necessary cable for repairs was ordered, and the bad places rewound and covered in, so that the cable, for all practical purposes, will be as good as new.

Several gasoline boats were kept on patrol duty, their crews hauling away the heavy collection of drift, which at times would almost force the barge down the river. Despite this and other hardships encountered, the cable experts won the fight and succeeded in dropping the cable in the river again.

This cable is about 4,500 feet in length and cost about $5,000 when laid a year ago. The 180 new feet of cable which was added weighed 3,500 pounds.

### A Telephone Order Desk.

The grocery department of one of the largest and most progressive department stores in Rochester, N. Y., has equipped its office with a special telephone order desk, to enable it to give its customers better service and to eliminate lost orders due to congestion of trunk lines. A view of this special order desk is shown in the accompanying illustration.

The equipment consists of a quartered oak flat top desk which measures 42x68 inches. The roomy design of the desk gives plenty of space for writing purposes and for the posting of special bargains, lists of fruits and vegetables in season, etc. It is built to accommodate an ultimate capacity of 20 exchange lines, eight being equipped for present operation. These exchange lines are multipled through four positions served by salesgirl-operators, two on a side. Each line terminates on lamp signals and answering keys mounted in the central section of the top, flush with the woodwork. A busy lamp is also mounted beside each line lamp in all positions. Each operator is provided with a chest plate type telephone set which leaves both hands free.

All incoming calls for the grocery department of the store are transferred from the main commercial switchboard

Telephone Order Desk in Rochester, N. Y., Store.

by means of eight tie lines to the order desk. These calls are indicated at the order desk by the illumination of the corresponding lamp at each operator's position. The first idle operator places herself in communication with the customer by throwing the proper key. This action darkens the call lamps in all positions and displays in its place a busy signal lamp. In case a customer is switched to the grocery order desk in error, the call can be reverted to the main switchboard by means of a special call circuit between the two boards.

This system has worked out in practice in such an excellent manner that the Rochester Telephone Co. has been able to close contracts with several other stores for the same kind of service. The order desk was manufactured by the Stromberg-Carlson Telephone Mfg. Co.

### Assessment of Telephone Companies in Oklahoma.

The Oklahoma state board of equalization has decided that telephone, electric light, street railway and all other public utility companies, except pipe line companies, shall be assessed for taxation this year on the same basis as last year, with the proviso that in no case will the assessment be made at a less figure than the net profits capitalized at 10 per cent.

This does away with much of the preliminary work which has taken up the time of the board in previous years. The employes of the state auditor's office will make their calculations on the basis as announced and when they are completed companies desiring to argue for reduced assessment will be notified and given a chance to appear before the board.

### Campaign Against Sign Tacking on Telephone Poles.

A resolution asking that the city commissioners of Fort Worth, Texas, prohibit the tacking of signs or cards on telephone poles has been presented to the Fort Worth city commission by the electrical workers' union. Linemen claim that candidates for office are using the poles as a place to tack cards and posters and that it makes climbing or descending the poles extremely dangerous.

### Valuation of Bell Subsidiary in Oklahoma.

Returns of the Pioneer Telephone & Telegraph Co., filed with the state auditor of Oklahoma to be used as a basis for assessment by the state board of equalization, give the corporation's property valuation as $6,100,390 as against

$5,565,180 for 1913. The value of the property of the company in Oklahoma county, where are located the general offices and the largest exchange plant in the state, is given at $1,427,915.

**Anti-Duplication Decision of Pennsylvania Commission.**

A decision of interest to all holders of public utility bonds has been handed down by the Public Service Commission of Pennsylvania, denying the application of an electric light company for permission to carry on a competitive business n the borough of Ashland. The ruling holds that public utilities should be monopolies under public regulation and that competition under such circumstances is undesirable.

The electric light business of the borough of Ashland is now done by the Eastern Pennsylvania Light, Heat & Power Co. The applicant for a franchise to establish a competing business was the Schuylkill Light, Heat & Power Co.

The commission held "that a reliance upon competition between public service companies for securing adequate service and proper rates has not been successful and that hereafter supervision by properly constituted authorities is to be substituted"; that competitive companies are invariably merged and the citizens are compelled to pay rates sufficient to give a return on the investment of duplicated properties.

This was the first case of its kind before the Public Service Commission of Pennsylvania.

**Citizens' Company Injunction at Cadillac, Mich.**

Until September 1, at least, Cadillac, Mich., patrons of the Citizens' Telephone Co. of Grand Rapids, Mich., will pay $15 for residence telephones and $24 for business telephones, instead of $18 and $28, respectively, the rate the company prepared to establish when it was halted by a circuit court injunction. After a hearing Circuit Judge Lamb continued the injunction until September, at which time the case will be heard on its merits.

The company maintains the court has no jurisdiction, as the matter of rates rests entirely with the Michigan Railroad Commission. It is contended on behalf of those opposing the raise, however, that the original franchise for a telephone service in Cadillac contained a provision regarding the rates which might be charged, such rates being based upon the number of telephones, etc.

**Fire Department Telephone Service at Red Oak, Iowa.**

A controversy is being carried on between the Red Oak Telephone Co., of Red Oak, Iowa, and the fire department over the sending in of alarms. In a hearing before the mayor the telephone company declared that it places too much responsibility upon the company to have the fire call locations told to Central, who then rings the proper signal at the fire station and locates the chief and volunteers somewhere in the city. The firemen say discontinuance of the system will greatly inconvenience them and jeopardize the community. The fire chief says discontinuance of the plan will mean the city must maintain a paid fire department. The question will be settled by the city council.

**Taxation of Underground Wires at Dallas, Texas.**

City Attorney Charles F. O'Donnell, of Dallas, Texas, has filed an opinion with the municipal commissioners of Dallas, maintaining that the Southwestern Telegraph & Telephone Co., should pay an annual tax on its underground wires, a matter which has for some time been a subject of dispute. The company had asked for permission to install an underground conduit carrying cables in a certain district. It is claimed that it should be permitted to do so under its franchise ordinances. City Attorney O'Donnel recommends in his opinion that permission for the laying of these underground cables should be granted only subject to all existing ordinances of the city of Dallas and that the city should not waive its rights in making the grant.

**Telephone System for Bergen, Scandinavia.**

The installation of a new semi-automatic telephone system with underground cable by the Bergens Telefonselakab is nearing completion, and when finished will give to Bergen the most modern and up to date system in any city in Scandinavia, says Consul Walter A. Leonard. The system is American, installed by an American company, which secured the contract after tendering a sealed bid according to plans and specifications furnished by the American consulate.

The annual report shows that the receipts from subscribers aggregate $61,382, number of subscribers 4,121. Length of mains, 11,905 miles, of which 9,673 miles are cable. The length of canals for underground cables is 39.5 miles. The new central station will cost $107,200, and will have a capacity for 15,000 subscribers. The original capital stock of $160,800 has been increased to $321,600.

**Telephone Business Not a "Mechanical Business."**

Attorney-General Walter C. Owens, of Wisconsin, has addressed to Secretary of State John S. Donald a communication embodying his opinion that a co-operative telephone company cannot be organized under section 1786 E-17 of the statutes. This section provides for the formation of associations "for the purpose of conducting any agricultural, dairy, mercantile, mining, manufacturing or mechanical business on the co-operative plan." In making this ruling the attorney-general says he is convinced that the telephone business is not to be deemed "a mechanical business" within the meaning of these words as used in the statute.

**Growth of Telephone Service at Omaha, Neb.**

Two new exchanges known as Colfax and Walnut will be built by the Nebraska (Bell) Telephone Co. for greater Omaha. Colfax exchange will serve the northwest part of the city from Thirtieth and Fowler avenue. Walnut exchange will serve Dundee from Forty-sixth and Izard streets. Each exchange is expected to cost near $100,000. When complete these will make nine exchanges for Greater Omaha.

**The Telephone System at Vladivostok, Siberia.**

On March 14, 1914, there were 920 telephones in use in the commercial telephone system of Vladivostok, Siberia, writes Consul John F. Jewell, of that city. This number does not include those in the military or fortress system, which is independent and has several hundred telephones. The latter system is connected with all outposts, as well as the commercial system of Vladivostok, which is quite generally commended for the excellent service rendered to its subscribers.

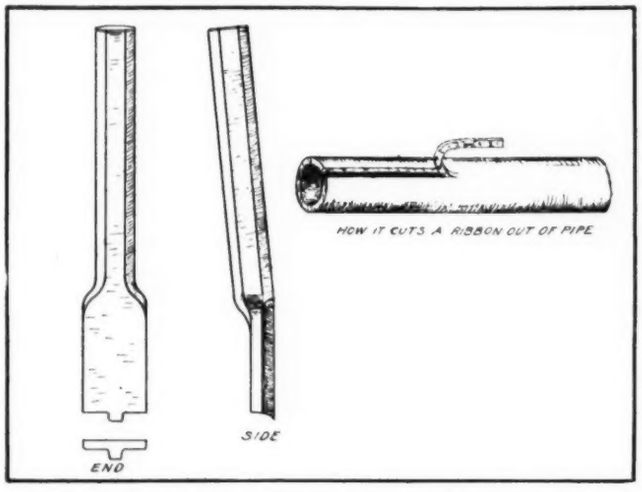
**Keokuk, Iowa, Case Before Federal Court.**

In the case of the Iowa Telephone Co. against the city of Keokuk, Iowa, arguments were recently heard in the federal court in that city on the appeal from the findings of the special master, Judge Robert Sloan, who, last December, heard several issues in the case and submitted findings favorable to the telephone company. The city contends that it has a right to regulate telephone charges and that the grant made to the company was not a perpetual one, whereas the company holds that it has a grant in perpetuity.

# Practical Subjects—Letters and Discussions

### Tool for Splitting Iron Pipe.

The accompanying sketch shows a tool that will split a ribbon out of a pipe in case the pipe cannot be raised or lowered. I had a case of cable trouble inside the iron pipe cas-




**Details of Tool's Construction and Ribbon it Cuts.**

ing on the pole, and the tool was the best scheme I could devise. I made a wooden model and a machinist made the tool.

C. E. Nicholas, Manager,
Redondo Beach, Cal. Redondo Home Telephone Co.

### Economical Method of Distributing Directories.

A very novel idea was carried out recently in Sayre, Pa., when the new directory of the Federal Telephone & Telegraph Co. was issued. Formerly directories were sent out to the subscriber, entailing considerable expense. This time the directories were given to the subscriber when he came to the office to pay his bill. This method proved very satisfactory to all concerned and, at the same time, saved the expense of delivering the directories.

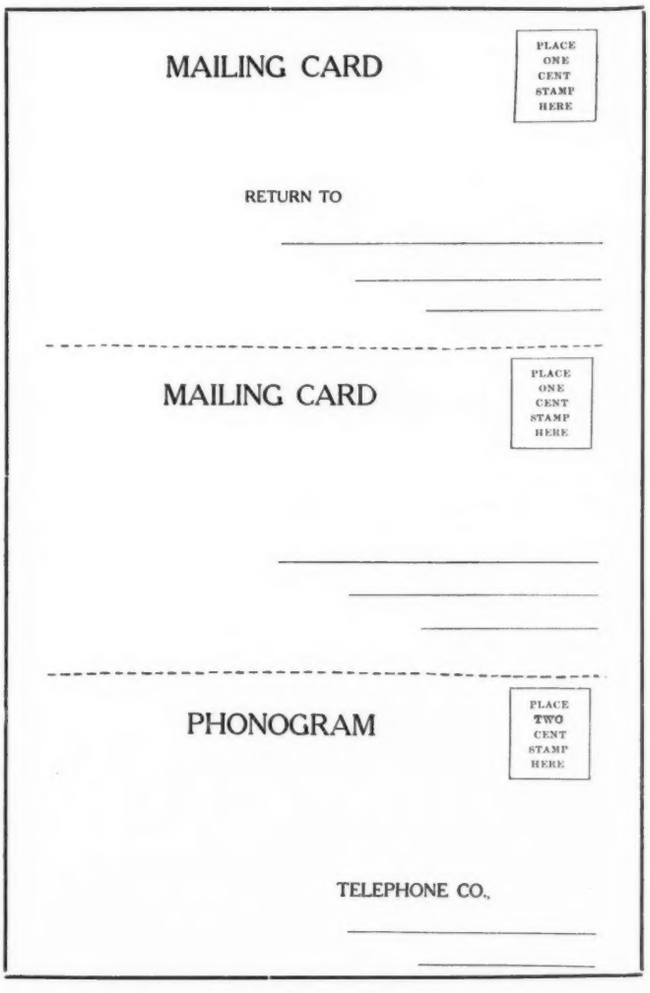
### The Phonogram.

The advent and utilization of new inventions invariably open up new lines of concurrent uses, or side lines as it were, which were of course unsuspected or not clearly comprehended by the inventor himself; and in the matter of the telephone, as we all know, these uses or possibilities have been not only numerous but of a nature to completely revolutionize the commercial and social business of the world. Small as may seem their importance to the isolated group of human beings, yet in the aggregate the force is tremendous and the volume of use unbelieveable.

The phonogram, though only barely comprehended, bids fair to be one of those modern conveniences which in all probability will come into general and immediate use, and in a short time we will wonder how we ever got along without its use, the same as we do the telephone today.

I have been requested by various telephone men to take the matter up with TELEPHONY so that all telephone men may know what a phonogram is and how it can be used to further convenience, and at the same time render an additional profit to the average exchange without additional expense. The telephone man of today is already beginning to see in various side lines more profit than could be made in the early days from other sources which were then supposed to be rich revenue producers—and were, but the revenues was not net—and he realizes that, like the miners in California today, he can make a profit out of diggings already worked over and abandoned, sometimes greater than were made by the first comers.

The phonogram is merely a postal card with a return attachment on which may be written a message which is mailed—not to the person for whom it is meant, but to the telephone company in whose district or town the person resides. The telephone company receiving such a phonogram turns it over to the operators, one of whom calls up the party over the telephone and repeats the message, thus injecting into it a personal element which is somehow lacking in an ordinary card or letter. Of course, such a card is limited to certain contingencies and is of no value in others. In sending a birthday, Christmas or other holiday greeting; a message to which a reply is wanted at once and you are not sure that you will get one by the ordinary

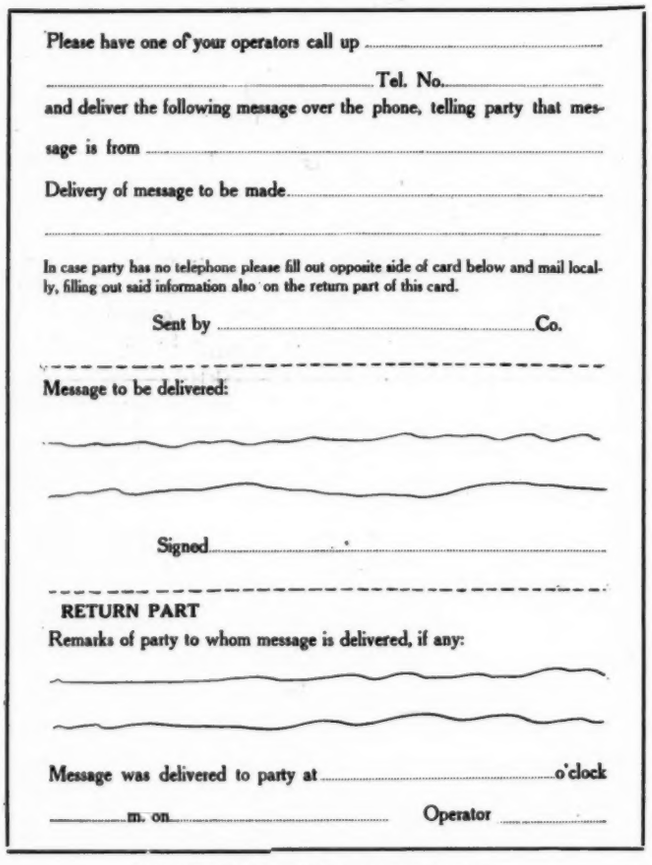



**Sections of Address Side of Phonogram Cards.**

means; a message to a friend too far away for use of the actual long distance wires when time is not an object, and in many other ways it fills a certain need, as time will show.

The operator delivering the message also makes a notation on the return part of the card of the remarks, if any, or reply of the party receiving the message and fills out the blank places with her name or number and the time when the message was delivered. The company then mails the card back to the party sending the message, thus giving him not only his answer but a check which will show

that the message actually reached the party for whom it was intended. In case the message is to be held for delivery at some certain time and on no other, like a Christmas or birthday greeting, the sending party does not have to bother about mailing it at just such a time to accomplish this, as it can be held, when sent long before, until



Please have one of your operators call up .....

.....Tel. No.....

and deliver the following message over the phone, telling party that message is from .....

Delivery of message to be made.....

.....

In case party has no telephone please fill out opposite side of card below and mail locally, filling out said information also on the return part of this card.

Sent by .....Co.

Message to be delivered:

Signed.....

RETURN PART

Remarks of party to whom message is delivered, if any:

Message was delivered to party at .....o'clock

.....m. on..... Operator .....

Message Side of Phonogram Cards.

the date specified. Should the party for whom the message is intended have no telephone, another card is also attached which the telephone company can fill out and mail to the party intended, thus getting the message delivered and off its hands; at the same time filling the return card out as before but, of course, without the return message or remarks.

Now as to the revenue part. It is intended that only telephone companies keep these for sale and that they be filled out and mailed only by a telephone company after a fee of say ten cents has been paid for the service including the stamps necessary for the sending and the return.

This the telephone companies can readily control as they can refuse to transmit any such messages unless sent from another telephone company.

To save constant sending to other companies of money as fees for repeating these messages it is proposed to have telephone companies do the repeating gratis and make their revenues by the sale of cards from their own offices, keeping, of course, all the fee that is left after supplying card and stamps, which would not come to more than four cents: One two-cent stamp for the sending of the phonogram and one one-cent stamp on the return card which is affixed at the originating office.

The fee would amount to as much as the five cents in and out that most of us receive, and does not tie up toll lines at all. It furnishes the government with additional revenues without letting the control of the business get out of the hands of the telephone companies. The messages can be transmitted at times when work is slack on the board and in many ways provide a very acceptable source of income without affecting any of the present sources of income.

Would be glad to hear from my brother managers on the advisability of our adopting the phonogram as a modern method of conveying certain classes of information via the mail and telephone.

Hutchinson, Minn. W. S. Clay.

[EDITOR'S NOTE: W. S. Clay, who is general manager of the Hutchinson Telephone Co., of Hutchinson, Minn., states that the postmaster general has sanctioned the use of these cards and that they have already been used with great success by Mr. Hutchinson's company, not only with the Tri-State Telephone & Telegraph Co., of St. Paul, but with other companies, and there has never been a failure to receive back the reply, except in one instance. The cards, which are reproduced in the accompanying illustrations, are not eligible to copyright and Mr. Clay gives the idea for the benefit of any companies that may desire to profit by it.]

### Needle in Twisted Pair Caused Trouble.

We have a grounded circuit running north seven miles with eight stations on it. The subscribers on this line are under contract to bring their telephones in for repair.

This line began to go "dead" for half an hour at a time perhaps longer, but by the time we could make a test on the line, it would come clear. This happened for several days and the subscribers began to bring in their instruments, thinking that they were the cause of the trouble, but every one brought in tested O. K.

Finally one subscriber brought in his telephone set and said the line was dead. After testing out the instrument and finding it O. K., I told him to take it back and if he then could not call in, to go to another station and call, and I would go out and see what was wrong. Later he called in from another station and he said his station was dead. I went out and on making a test this time, the line being short circuited, the trouble tested in the house and the line tested O. K. The house wire was new and of No. 18 twisted pair distributing wire. Where the wire came out from under the house, someone had driven a needle into the line and broken it off on each side. The needle did not show at all and did not make a connection all the time. It, however, made a good enough contact the last time, so that I could locate the trouble.

C. M. Hamrick, Inspector,
Gainsboro Telephone & Telegraph Co.,
Carrollton, Ga.

### Telephone Investigation at Houston, Texas.

The Southwestern Telegraph & Telephone Co., at Houston, Texas, and the Houston Home Telephone Co., will be investigated by Henry L. Elrod and Lamar Lyndon, as the Houston Lighting & Power Co. was some time ago. It the investigation discloses that the companies are making exorbitant profits and they refuse to reduce their rates, municipal plants will be erected, according to an announcement from Mayor Campbell. He insists that no difficulty would be encountered in procuring long distance connections and proper service should the city decide to take charge of the telephone system.

The investigators will be paid $11,000 for their work. It has been charged that the two telephone companies are owned by the same interests and that will be made an important feature of the inquiry. The mayor has expressed the belief that in a city the size of Houston public utilities should be subjected to a sweeping investigation at least once every five years.

# The Trade Paper—Its Achievement

## By ELBERT HUBBARD

It is a somewhat curious fact that in many daily newspapers a wide gulf exists between the reader and the advertiser.

The newspaper may advertise clairvoyants, fortune tellers, palmists, astrologers, fake remedies, and fraudulent financial schemes, and the subscriber does not wink an eyebrow. But let a trade paper advertise a machine of problematic value, and the editor would have the subscribers right on his back.

It is assumed by the readers of a trade paper, that the editor knows every advertiser and is familiar with his products. If not, he should be, and, as a matter of fact, he is. And this confidence of the subscriber has a deal to do with holding the editor to his task.

A great many magazines publish anything that "listens good," and the publisher hopes it is all right. If it isn't all right, he doesn't want to know about it, and isn't thankful when he is told. With the trade paper, the editor cannot countenance "explosives" in his ads. If he does, he loses subscribers, and if he hasn't subscribers, he cannot expect advertisements. And without advertisements, he cannot produce the best paper.

For advertisements not only bring the money that buys gasoline, but the subscriber prizes the trade paper on account of the fact that it advertises the machinery and the goods he needs, and also tells the truth about them.

It will thus be seen that editor, advertiser, and subscriber, occupy a close triangular family relation. Their interests are mutual. If the trade paper did not help the subscriber up the incline plane towards success, it would not and could not exist.

"Each for all, and all for each" is fast becoming the universal slogan. "From every man according to his ability, to every man according to his need," is the new evangel.

There is no such thing as distinct interests, apart from each other. The manufacturer needs the miner, the miner the manufacturer; they both need the farmer, and we need them all.

One may be a hewer of wood or a drawer of water, another a captain of an industry. One may be a toiler in the valley, and still another in the observatory on the mountain top, reading the signs of the times. But their success hangs upon their co-operation—their reciprocity—their interrelation.

True progress is only possible where there is mutuality and co-operation—where we see the seeming paradox of individual liberty harnessed to the care of common weal.

We grow by giving. Power comes from knowledge. Knowledge is absorption and ejection—taking in and giving out. It is a process of interaction. Thus we get to know each other, to understand the differences of individual, inimical, and communal interests—to have confidence and to combine.

Business is now done right out in the sunlight. Publicity is the salvation of both dealer and consumer.

I have said that we are breaking away from distrust of our fellows. That is true; but we still find people whom it is a task to induce to believe this.

The vast majority of people, though, see that the man who advertises his commodities or service as "quality" must produce them—else his successful days are numbered.

No trade paper will publish punk publicity. The trade paper is a publication wherein can be found ideas, plans and information.

The reason is that its subscribers are alert and progressive—alive to their possibilities and to the good things in the world of science and invention.

I know no better medium for the exchange of ideas than the trade paper. Its pages bristle with interesting facts, and pulse with intense humanism and understanding.

The task of the advertiser in the trade paper is made a pleasant one by reason of the intelligent receptivity of the subscriber.

The subscriber and advertiser recognize the benefit of business reciprocity, and fully appreciate the friendship based upon it. They know each other's needs—that they need each other for their individual growth. They acknowledge the distinct services to each other.

Whether you call this sentiment, or something else, yet it is the very essence of success.

The trade paper has made giant strides. Its intimacy and strength with its subscribers and contributors are remarkable. But its greatest achievement, to my mind, is the creation of a bond of sympathy, mutuality and understanding between its subscribers and advertisers that is unique.

And we do business with our friends—our enemies will not trade with us, anyway.

(Copyright, 1914, Kovnat Adv. Service.)

# From Factory and Salesroom

Conventions: Tri-State, Jackson, Tenn., May 19, 20; Railway Telegraph Superintendents, New Orleans, May 19, 20, 21 and 22

**Exhibit of Northern White Cedar Products.**

Those who visited the Forest Products Exposition conducted at the Coliseum from April 30 to May 9, will agree that there was no exhibit more representative, complete or interesting than that of the Northern White Cedar Association. The prime object of the exposition was to exemplify to engineer, architect, dealer and consumer the adaptability of wood for different classes and conditions of service in preference to any substitutes which are offered. The plan of featuring wood exclusively, of arranging for a gigantic exposition, of securing co-operation among all the different associations, and of arranging for its financial success is no small undertaking. If the New York Show, to be held at the Grand Central Palace, May 21 to 30, inclusive, is as successful as was the Chicago production, the associations interested in the project may well feel repaid.

The Northern White Cedar Association has on more than one instance shown its progressiveness, and its wholehearted participation in this event was to be expected. Its exhibit, of which the accompanying illustration is a good reproduction, was at all times well attended, with the result that many more people are now familiar with the value, utility, and economy of northern white cedar products. The Northern White Cedar Association was organized at Menominee, Mich., in 1896. It was first known as the "Northwestern Cedarmen's Association," which name was recently changed to the Northern White Cedar Association in order to correspond to the name given by the U. S. Forest Service to the cedar timber growing in the states of Michigan, Wisconsin and Minnesota, from which the products of the members of the association are manufactured.

The object of the association is to establish grades of poles, posts, ties and shingles which will be standard and to maintain those grades so that the purchaser may be assured of procuring material suitable for his purposes. The association also looks after the interests of its members in the establishment of minimum carload weights and railway freight rates. A traffic department is sustained within the association to handle for the members all matters pertaining to freight rates, railway claims and tracing of cars. It also provides means for official inspection in the settlement of disputes between its members and their customers.

The membership of the Northern White Cedar Association includes the following companies:

Bay de Noquet Co., Nahma, Mich.
Bell Lumber Co., Minneapolis, Minn.
Clark Pole & Tie Co., Bemidji, Minn.
Cloquet Tie & Post Co., Cloquet, Minn.
Crawford Cedar Co., Menominee, Mich.
Curry & Whyte Co., Duluth, Minn.
Duluth Log Co., Duluth, Minn.
Erickson & Bissell, Escanaba, Mich.
Finch Bros., Duluth, Minn.
Learned Cedar Co., Minneapolis, Minn.
McCullough & Moss Lumber Co., Minneapolis, Minn.
MacGillis & Gibbs Co., Milwaukee, Wis.
Martin Bros., Duluth, Minn.
Meloney Bros., Spooner, Minn.
National Pole Co., Escanaba, Mich.
Naugle Pole & Tie Co., Chicago, Ill.
Page & Hill Co., Minneapolis, Minn.
Partridge Lumber Co., T. M., Minneapolis, Minn.
Pendleton & Gilkey, Minneapolis, Minn.
St. Croix Pine & Cedar Co., Blackduck, Minn.
Stephenson Co., I., Trustees, Wells, Mich.
Sterling & Son Co., W. C., Monroe, Mich.
Torrey Cedar Co., Clintonville, Wis.
Valentine-Clark Co., The, Minneapolis, Minn.
Western Electric Co., New York City, N. Y.
White Marble Lime Co., Manistique, Mich.
Wisconsin Land & Lumber Co., Hermansville, Mich.
Worcester Co., C. H., Trustees, Chicago, Ill.

**A. J. Carter, General Sales Manager.**

Yes, that is the way this Kellogg man signs himself now, and hundreds of friends in the telephone world will congratulate him and point to him with pride, as a man "who does things." Few men in this world accomplish much unless they have been arbitrarily re-christened with a nickname, and this is what his happens to be—"Nick." As "Nick" Carter, the telephone world knows him well and appreciates his worth.

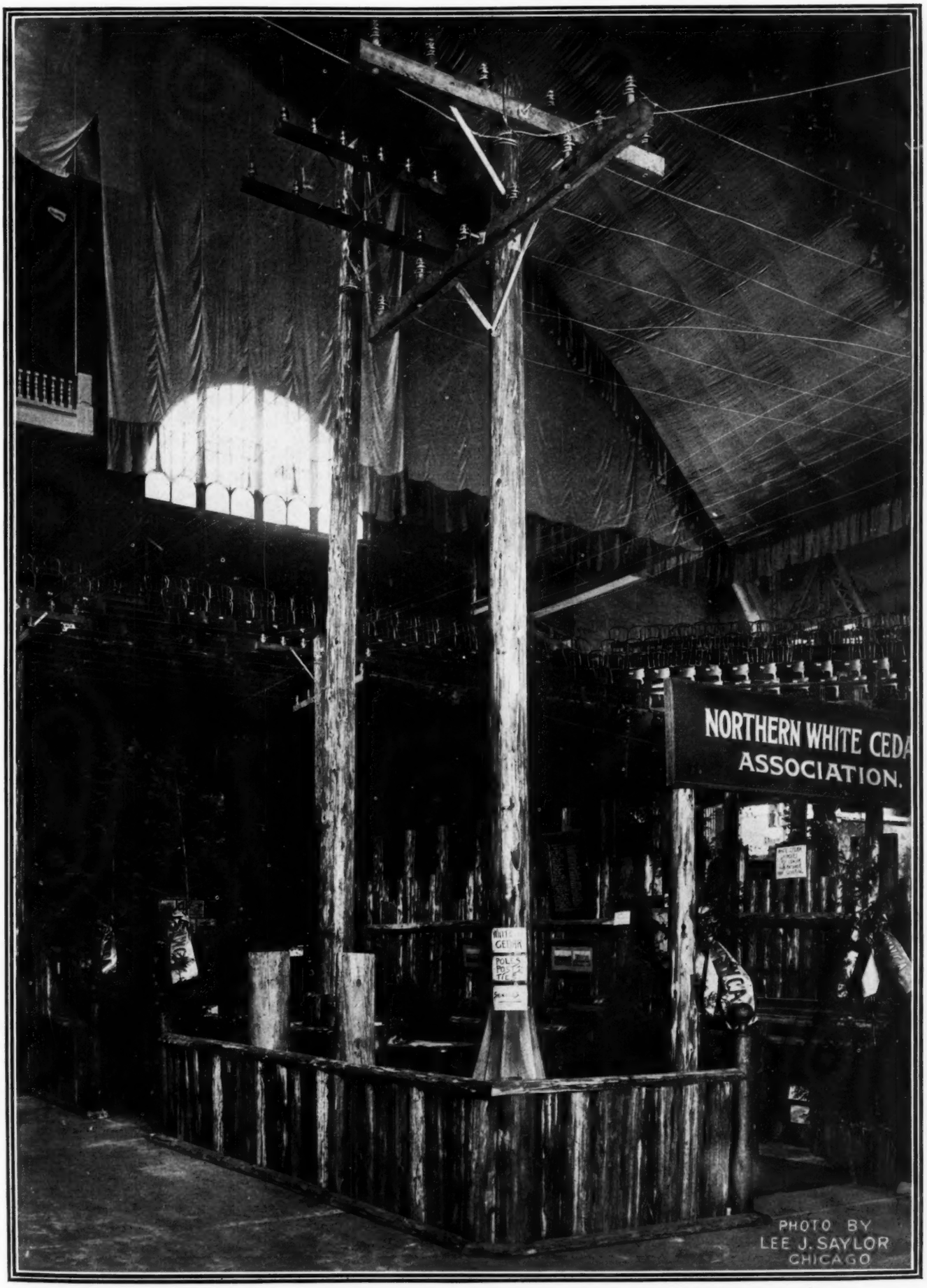
A. J. Carter.

Mr. Carter was ambitious from the first, as will be noted from the fact that he selected the natal day of the "father of his country" upon which to be born and honored George, Iowa, with his advent on February 22, 1882. In 1905 he married Miss Blanche Percival, of Ida Grove, Iowa, and their happiness has been greatly enhanced by the arrival, some seven months ago, of a daughter.

Back in 1898 Mr. Carter was lineman in George, Ia., and did splendid work when Eagle Grove built its plant. He also helped build the toll line from Webster City to Ft. Dodge, Ia. In 1900 he was installing plants for the Globe Automatic Co. out in Iowa and Nebraska and, when not thus engaged, was blazing trails in virgin territory and doing the sort of missionary work which counts. He has held many responsible positions with various Independent operating companies and has been a constant student in the ever broadening work. Not the least worthy of his mile stones, was the rebuilding of the telephone and electric light plant at Devils Lake, N. D. Here he gained first hand knowledge of the force of gravity through a 30-foot fall from a telephone pole, which broke his arm and from that time on decided not to use climbers.

After the latter experience he was located at Sheldon and Sibley, Iowa, and finally became connected with the Ida Grove Telephone Co., and rebuilt the Corydon, Ia., plant. From there he went to the Wayne County Telephone Co., Seymour, Ia., where he assumed charge until his best interests demanded that he go to Chicago to look after, and market, a special test set of his invention.

This brought Mr. Carter in touch with the Monarch company which for eight years claimed him for its own and he exploited Monarch products during that period in Iowa, Nebraska and South Dakota. Many valuable im-




The Exhibit of the Northern White Cedar Association at the Forest Products Exposition, Chicago.

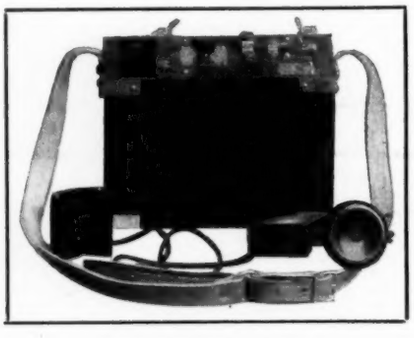
provements in their apparatus are due to his skill. His experience, not alone in installing switchboards, but in rebuilding plants and in appraisal work, made him well known. In Iowa alone over 200 switchboards installed, pay tribute to his energy.

In 1912 he enlisted with the selling force of the Kellogg Switchboard & Supply Co. as sales engineer with headquarters at Sioux City, Ia. One reads earnestness, "stick-to-itiveness" and thoroughness in his quiet speech and manner and it is no surprise that Mr. Carter has reached a top rung of the ladder.

### Stewart Cable Tester.

A new cable tester invented by Chris Stewart, junior member of the firm of Stewart Bros., Ottawa, Ill., makers of testing instruments, has been placed on the market by that firm. This cable tester, which is shown in the accompanying illustration, will locate, it is declared, ground crosses and shorts as well as wet spots in cable. With this tester it is said that short circuits in the core of 400 pair cable have been located.

The tester has an indicating lamp which is very useful for picking up crossed or grounded wires and also for telling from time to time if the trouble is still in. To do the latter it is only necessary to push a button on top of the set and the light shows whether or not the trouble is still there; it is not necessary to disconnect the instrument and make a separate test, and any one by pressing



Stewart Cable Tester.

a button and watching if the lamp shows a light, can give the man out on the cable the information he wants. This saves time for the cable man, making it unnecessary for him to come to the office and test out the pair. This lamp is said to be invaluable to the cable man when the sender is taken out of the office, which is necessary when pairs are open in, and grounded out.

The exploring coil used with this tester is stated to be neutral to all current on the sheath of the cable regardless of the size of the cable. That is, it will not pick up the tone off the cable armor. This is declared to be an exclusive feature. The coil being neutral, will not go by on ground tests, even if there are insulated joints in the sheath or loop boxes with the sheath not bonded through. This, the company points out, is valuable because it is always preferable, where possible, to have the sender in the office where the wire chief can watch it and sometimes it is necessary to have insulated joints in the sheath, owing to electrolysis. Without this feature whenever a pair showed ground out beyond the insulated joints in the armor, it would be necessary to take the sender to the end of the cable and locate back. With this cable tester it is only necessary to take it out of the office when a pair shows trouble out, and open in. This feature also, it is claimed, prevents false location of trouble.

The vibrator is so constructed that it cannot be adjusted down or up far enough to stop it from buzzing. This prevents the chance of its being screwed down too tight and putting the batteries out of business. The use of the instrument is simple and covers no complicated circuit arrangement.

The sender with a separate exploring coil, which the company furnishes, is very useful for picking up shorts in twisted pair wire. This exploring coil is no larger than a pocket knife and can be carried in the pocket. It has terminals to which a common test receiver can be attached.

The sender is also said to be a very efficient howler and can be used for hanging up receivers that have been accidentally left off the hook. It is also said to be without a peer for ridding the line of persons attempting to listen in.

### Western Electric Loses Patent Suits.

The United States District Court for the Northern District of Ohio has dismissed the suit brought by the Western Electric Co. for infringement by the Dean Electric Co., of Elyria, Ohio, of letters patent No. 596,625 to C. E. Scribner and No. 760,549 to F. R. McBerty, covering a certain form of connecting plug and spring jack used in telephone switchboards. After reviewing the entire situation with respect to these patents, the court holds as follows:

"I am of the opinion that the Scribner patent in suit is void, especially in view of the Hill invention, and that the McBerty patent is void in view of the Scribner patent in suit."

This is the second suit brought by the Western Electric Co. against the Dean Electric Co. and decided adversely to the complainant. The first was that brought upon the McQuarrie patent No. 659,759, which was dismissed on the grounds that all of the claims of the patent were void in view of a disclosure in a Swedish publication Teknish Tidskrift in 1897.

### For the Advertising Manager.

"Making Good with your Appropriation," is the title of a handsomely illustrated and well-printed, 48-page booklet just issued by the Yawman & Erbe Mfg. Co., Rochester, N. Y. It is published as an aid to the advertising manager, pointing out efficient and practical methods for planning and systematizing his department.

The booklet includes descriptions and uses of what may be termed the personal records of advertising managers such as the data file, the appropriation record, the publicity record, record of prospective publications, the inventory report, etc. These are the records which should be on or convenient to the manager's desk. Then there are the records of a departmental nature which include the forms for ordering printed matter, cuts and display advertising of various kinds; forms for checking invoices and distributing expense for ascertaining costs of printed matter and for keeping a record of quotations, etc.; and systems for filing clipped ads., drawings, photographs, correspondence, competitive literature, etc.

The advertising manager will find much of interest in this booklet, a copy of which may be obtained by addressing the advertising department of the Yawman & Erbe Mfg. Co., Rochester, N. Y.

### Paragraphs.

JAMES R. KEARNEY has resigned from the Western Electric Co. to accept a position as special representative for W. N. Matthews & Bro., St. Louis, Mo. This became effective on May 1. Mr. Kearney has been in the electrical business for many years and was connected with the Western Electric Co. for nearly three years.

# Legal Cases and Decisions

By A. H. McMillan

### Right of Way, Sleet Storm and House Moving.

"I would like to have you give us your opinion on the following:

"If a pole line has been established for three or four years, can the property owner make one move the poles across the road or pay him something for the right of way, even if he did not object to them in the first place?

"After a general sleet storm that tears the lines and poles down all over the country, could a person make us pay damages which his buggy received in becoming entangled with the lines, even though the lines had been down along the road for several days, or could they even if the lines had been in the road?

"We saw a ruling some place which stated that a man could not be held responsible for the works of the Almighty and that this could not be held as carelessness or neglect on the part of the company, and was unavoidable by human power.

"The other point we wish to know about is house moving, or the moving of oil drilling rigs along the streets and roads. We understand that the lines in this state are required according to law, to be 20 feet high where they cross the streets and roads. If they are not that high in some places, can a house mover run into them and tear them down or take down and let us put them back at our expense? We saw a ruling in some state where we could not be compelled to move or raise wires, even though they were not the height required by law, on the ground that streets and roads were not made for house moving, that house moving is not the ordinary traffic or travel, for which streets and roads are to be used.

"Will you kindly advise us what the law is on these points and tell us of any rulings on them in Illinois and what actions would have to be started against house movers for damages done or about to be done?"

A property owner can force you to move your poles across the road or pay him for his right of way. If he did not object to them in the first place, that was merely a license by implication which is revocable at any time at the will of the grantor.

While a man is not responsible for the works of God, it is a rule that when wires are torn down by such an act, the company to which they belong is liable for any injuries that may occur, if they are left down an unreasonable length of time after the company has notice of their fall. Applying this to your case, the person owning the buggy could make you pay damages, if the lines had been down longer than was necessary for you to repair them, or if you were negligent in not moving them out of the road after they had fallen.

As to the moving of houses, or oil drilling rigs along the streets and roads, a house mover has no right to injure or damage your wires or to take them down without permission. A telephone company can insist that the house mover pay the expense of taking down or putting up the telephone wires and may also be required to give a bond to save harmless the company from any damage that may result to themselves or to others from the wires being down. We do not know of any ruling that establishes this principle where the wires are below the height required by law for them. Even if the wires are lower than the law requires, a house mover has no right to run into them or tear them down, or damage them in any way if he does he may be sued for damages. We know of no rulings in your state on the subject. See McMillan on Telephone Law, section 240.

### Effect of Narrowing the Highway.

"There are some farmers in our territory circulating petitions among the farmers to sign, to have the highways cut from 66 feet to 50 feet. This will put the lines out on each side about 8 feet and will leave our pole lines in the fields. Our lines have been up about six or eight years and we would like to know if they can make us move our poles out if their petition goes through. If so, can we have any recourse for the expense in making the change, or can we get up a remonstrance against the petition to knock it out? Anything on this question you can give us will be appreciated."

You do not give us enough information in the above queries to enable us to answer your question definitely. What the effect would be upon the telephone line would depend upon the rights your company has in the highway and from whom such rights were obtained. If the rights were obtained from the farmers, we doubt whether you could be required to move. If, however, the rights were obtained from the public authorities, you could undoubtedly be compelled to move your poles, and not have any recourse for such expense. Of course, you can remonstrate, and should do so as effectively as possible.

### Connections in Oklahoma.

"Our company is unincorporated and has no franchise. We operate an exchange of 165 telephones in a small incorporated town. The exchange consists of 40 telephones in town and 125 in the country; rates for any of them are $1 per month. The telephones in the country are on party lines about 10 or 12 to a line. We own and maintain all the wire, posts and telephones. A farmers' mutual line of eight telephones has been organized here and wants connection with us. We want to know if they can, under the laws of Oklahoma, force us to give them connection. We are willing to buy their lines and telephones and put them on our lines on the same terms as our regular subscribers. If they force us to give them connection I think our end is in sight, so far as rural lines are concerned. All we will have left will be some old poles and wires. Any information will be greatly appreciated."

As we understand the laws of your state, the mutual line can petition the state commission that has jurisdiction over such subjects, for connection, and if able to obtain an order from the commission, can force you to give them connection upon such terms and conditions as the commission says.

### Paralleling by Electric Light Wires.

"There is an electric light plant coming into our town from another town 12 miles away. If we find that it interferes with our service, can we compel them to go up certain streets and alleys to keep from paralleling our lines? The town has already given them a franchise. The telephone franchise was granted some eight or nine years ago. I would also like to know what course to pursue to have a telephone put in the St. Louis & Western Railroad station here, and to make them pay for it, as the lack of one is very inconvenient to the public."

If you find the electric light plant interferes with your service, you can have them enjoined from such interference, but cannot compel them to go upon certain streets and alleys to do that. After they were enjoined from interfering with you, they would be at liberty to go where they pleased, in accordance with their franchise, so long as it did not interfere with you.

As to putting a telephone in the railroad station, if the law requires them to have one, you should make a complaint in accordance with the law for their failure to do so.

### Use of Indecent Language on Party Lines.

The laws of Texas make the use of vulgar, profane, obscene or indecent language over or through a telephone a misdemeanor. Under this law a subscriber of a telephone company called up another on a party line and discussed with him over and through the telephone the insufficient service the telephone company was giving its subscribers. At least two others on the party line heard the conversation. The witnesses said that certain indecent words were twice used. The defendant was convicted under the law.

The court said that it was well known that the telephone exchanges in the state are in charge of and operated by young ladies almost exclusively; that it was evidently the intention of the legislature to protect them as well as the patrons of the telephone companies from hearing such language; that the proper way to protect them was to make it an offense and punish the person who used it. The court further said that it made no difference whether such person used the language in anger or otherwise, or used the language to and of the person to whom he was talking. The appellate court affirmed the conviction. Darnell vs. State, 168 Southwestern 971.

# Condensed News Reports

**Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems**

### Personal.

NEAL WAUGH has been appointed manager of the Wellington, Kans., office of the Missouri & Kansas Telephone Co.

B. W. BURNETT has resigned from his position as local manager of the Dakota Central Telephone Co., at Tyndall, S. D. E. J. Calindine has been appointed as his successor.

R. L. GALLOWAY, of Georgetown, Tex., has been appointed local manager for the Brazos Valley Telephone & Telegraph Co., at Mart, Tex., succeeding D. Alexander, who has been transferred to the installation department at Waco.

EUGENE KEMP, for the past five years manager of the Corning, N. Y., district of the Federal Telephone & Telegraph Co., has been promoted to the management of the Ithaca, N. Y. office which is one of the largest exchanges of the Federal company outside of Buffalo.

L. C. WOOD, recently appointed local manager for the Federal Telephone & Telegraph Co., at Corning, N. Y., to succeed Eugene Kemp, has been connected with the Federal company for the past four years as general agent and adjuster. He has spent much of his time traveling in the interest of the company.

J. R. THOMPSON has assumed the duties of his new position as general traffic superintendent of the Pioneer Telephone & Telegraph Co., at Oklahoma City, Okla. Mr. Thompson entered the service of the Pioneer company in 1906, after a short period with the Missouri & Kansas Telephone Co., and his progress has been rapid but sure. He has held the positions of traffic engineer, district traffic chief, and about a year ago he was appointed division traffic superintendent, in which capacity he has served until his recent promotion.

C. B. CRABBE, who succeeds J. R. Thompson as division traffic superintendent of the Pioneer Telephone & Telegraph Co., entered the service of the Pioneer company in 1911, and served as chief clerk to the general traffic superintendent for nearly two years. He was then promoted to district traffic chief of the Oklahoma City district. He occupied this position until the early summer of 1913, when he was called upon to do special work, upon which he was engaged at the time of his appointment as division traffic superintendent.

### New Companies and Incorporations.

BETHANY, ILL.—The Bethany Mutual Telephone Association has been incorporated by Wm. H. Mason, George McLaughlin and Isaac M. Woodruff to construct and operate a telephone system in this vicinity.

DENVER, KY.—The Middle Fork Telephone Co. has been incorporated with $1,000 capital stock by J. W. Candill, Jesse Candill, Paris Candill and Mason Fitch.

ELK FORK, KY.—Articles of incorporation have been filed by the Elk Fork Telephone Co. with $3,000 capital stock. The incorporators are: H. F. Farnin, Walter Skaggs, J. F. Skaggs and A. T. Wings, all of Elk Fork.

ROME, KY.—The Rome Mutual Telephone Co. has recently been organized by O. H. Snyder, Max Keller and Adam Keller, to construct and operate a telephone system in this town.

EMPIRE, MICH.—The Shore Line Rural Telephone Co. has filed articles of incorporation with $2,000 capital stock. The incorporators are: Albert F. Morgan, of Honor; George B. Tweddle, J. W. Esch, Paul P. Rohns and L. J. Pelky, all of Empire.

ANTELOPE, MONT.—The Antelope Telephone Co. has been incorporated with $25,000 capital stock. The directors of the company are as follows: H. O. Stenehjem, and F. D. Morck, of Antelope, P. L. Jensen and P. R. Paulsen, of Dagmar.

REEDS, MO.—A company is being organized to build a cooperate telephone system to connect with Reeds, Sarcoxie and Diamond, by T. A. Roper, of Reeds, and others. One hundred subscribers are said to have already been secured.

WHARTON, N. J.—Articles of incorporation have been filed by the Delaware Park Telephone Co. with $2,000 capital stock. The incorporators are: Frank G. Shiffert, Arthur J. Hamlen, and John W. Opdyke, all of Wharton.

BINGER, OKLA.—The Centerville Rural Telephone Line has been incorporated with $350 capital stock by George Payton, president, and W. J. Newnum, of Lookebaa, W. S. Witlock, secretary, of Gracemont, and J. N. Arthurs, of Binger.

SALEM, ORE.—The Dayville-Canyon Telephone Co. has been incorporated with $2,500 capital stock, by S. Green, W. O. Cummings, and R. Danby.

SILVER LAKE, ORE.—Articles of incorporation have been filed by the Silver Lake Telephone & Telegraph Co., with $2,500 capital stock. The incorporators are: E. K. Henderson, A. B. Schroder and J. W. Thom.

BELLEVILLE, PA.—The Farmers Telephone Co., which for the past 11 years has been owned and operated by B. Harry Smucker, has recently been incorporated with $5,000 capital stock by B. H. Smucker, F. W. Warner, W. K. McClenahen and John T. Wilson.

NEW ZION, S. C.—The New Zion Telephone Co. has been chartered with $1,500 capital stock to do a general telephone business. The officers are: E. B. Gamble, president; W. C. Plowden, vice-president; P. M. Gibbons, secretary; C. W. Lavender, treasurer.

TURBEVILLE, S. C.—Articles of incorporation have been filed by the Turbeville Telephone Co. with $1,500 capital stock. The incorporators are: D. E. Turbeville, M. J. Morris and D. L. Green.

YANKTON, S. D.—Articles of incorporation have been filed by the South Dakota Telephone Co. with $1,500,000. The incorporators are: E. A. Bruce, Howard Warren and W. L. Bruce, all of Yankton.

NORWOOD, VA.—The Nelson County Telephone Co. has been incorporated with $3,000 capital stock. The incorporators are: S. M. Golladay, president, Buffalo Station; J. L. Gray, D. E. Nelson, C. D. Mundy and W. Reed Putney, of Norwood.

DORCHESTER, WIS.—The Central Mayville Mutual Telephone Co. has been incorporated with $600 capital stock by G. Laack, G. F. Schmidt, N. H. Laveen, Herman Krase and George Koehn, all of Dorchester.

TORRINGTON, WYO.—The Torrington & Horse Creek Telephone Co. has been organized to build a line from this town to LaGrange. Over $1,000 has already been subscribed. A temporary organization has been effected with Jess Yoder chairman, W. E. Landau, secretary and H. W. Yoder, treasurer. A committee constituting W. G. Vance, T. G. Powers and Dr. C. H. Platz, was appointed to take charge of the construction.

WOODLAND, WIS.—The Woodland Telephone Co. has been incorporated with $300 capital stock by George O'Connor, Lewis Herrewig and William Ratzburg, all of Wonewoc, Wis.

### Construction.

NOGALES, ARIZ.—The Mountain States Telephone & Telegraph Co. has been ordered by the corporation commission to reconstruct and rebuild its telephone system in this city.

TUCSON, ARIZ.—Extensive improvements, entailing an expenditure of $25,000, will be made by the Mountain States Telephone & Telegraph Co. through the northern part of Arizona. An entire new plant will be installed at Flagstaff and extensive improvements made at the Williams office.

NAPA, CAL.—R. W. Miner, local manager of the Pacific States Telephone & Telegraph Co. has received word from headquarters that the sum of $3,100 is to be expended by the company in improvements to its system in this city.

CROSWELL, MICH.—The Croswell Telephone Co. is erecting a new exchange in this town.

ALBANY, N. Y.—The New York Telephone Co. has awarded the contract for the construction of its new exchange building in this city, and work will be commenced soon. An appropriation of $1,414,000 has been made for the new exchange, which includes new equipment, cable work and other features.

WOODRUFF, S. C.—The Home Telephone Co. is making extensive improvements to its plant here. A heavy cable is being stretched in the downtown section and many new telephones are being installed.

NEW BRAUNFELS, TEX.—The Southwestern Telegraph & Telephone Co. is planning to make extensive improvements to its local plant in this city. The work includes a considerable

amount of outside cable construction and improvements to the central office equipment.

SULPHUR SPRINGS, TEX.—The Northeast Texas Telephone Co. is spending several thousands of dollars, in making betterments to its exchange in this place.

HARRISONBURG, VA.—The Harrisonburg Mutual Telephone Co. is building a new line to Bridgewater and thence to Mount Solon.

RACINE, WIS.—Extensive improvements are being made in this city by the Wisconsin Telephone Co. At present there are about 6,000 telephones in use and it is expected that this will be increased to 7,000. It is estimated that before the work is completed the sum of $72,000 will have been expended.

### Underground.

PASADENA, CAL.—The Pacific Telephone & Telegraph Co. is spending nearly $50,000 in improving its long distance facilities between Los Angeles and Pasadena. A large sized underground cable is being laid between Los Angeles and South Pasadena, where connections with its Pasadena cables will be made.

GARY, IND.—The Chicago Telephone Co. will spend $40,000 in improving and extending its underground and aerial cable facilities. Six miles of new aerial cable and four miles of underground cable will be placed. Several miles of open wire is to be taken down and replaced by large cable adequate to care for future growth.

PONTIAC, MICH.—The city council has ordered the Michigan State Telephone Co. to place its wires on the paved streets in underground conduit.

BOZEMAN, MONT.—The city council has passed an ordinance requiring the State Telephone & Telegraph Co., and all other wire companies except the trolley system, to place their wires in the business section of the city underground.

SUPERIOR, WIS.—The Wisconsin Telephone Co. has commenced work on an extensive underground system, which, when completed, will cost about $35,000.

### Financial.

LITTLE ROCK, ARK.—The Arkansas-Missouri Telephone Co. has increased its capital stock from $25,000 to $50,000.

JACKSONVILLE, ILL.—At the semi-annual meeting of the Illinois Telephone Co., which was held recently, a 3 per cent. dividend was declared.

PROPHETSTOWN, ILL.—The Prophetstown Mutual Telephone Co. has voted to increase its capital stock from $10,000 to $12,500.

### Elections.

AUGUSTA, ILL.—At the annual meeting of the Augusta Mutual Telephone Co. the following officers and directors were elected for the ensuing year: President, E. L. Thomas; board of directors, J. A. Mead, E. E. Van Brunt and C. H. Mead; manager, E. E. Van Brunt.

FALL RIVER, MASS.—At the annual meeting of the Fall River Automatic Telephone Co. the following officers were elected for the ensuing year: Clerk and treasurer, Clark Chase, Jr.; directors, John T. Swift, Danforth H. Hathaway, Martin P. Feeney and Bradford D. Davol, all of Fall River; R. F. Hemenway, Fred W. Story and George H. Dresser, of Boston.

FULTON, MD.—The stockholders of the Bedford Fulton Telephone Co. held their annual meeting recently and chose the following men as directors: John S. Hershberger, H. F. Gump, J. F. Biddle, Esq., H. E. Laher, Dr. H. W. Bender and George W. Hughes, Elza McElfish, E. V. Snyder, and John Q. Nycum. The board of directors organized by electing the following officers: President, Dr. H. W. Bender; vice-president, J. F. Biddle; secretary, John S. Hershberger, and treasurer, H. F. Gump.

RISING SUN, MD.—The stockholders of the Cecil Farmers Telephone Co. held their annual meeting recently at which William M. Pogue, I. Wayne Reynolds and C. R. Biles were re-elected directors for three years. The directors organized by electing R. K. Rawlings, president; Cecil E. Ewing and Elwood Balderston, vice-presidents; J. T. C. Hopkins, secretary and treasurer.

MILES CITY, MONT.—The Miles City & Ekalaka Telephone Co. held its annual meeting recently and elected directors and officers for the ensuing year, as follows: President, George M. Miles; vice-president, E. B. Holt; secretary-treasurer, H. F. Lee; directors, J. H. Price, Dan Bowman, Kenneth McLean and F. D. O'Neill. The affairs of the company were reported to be in a most encouraging condition, and the company decided to rebuild four miles of its line.

HILLSDALE, N. Y.—The election of directors of the North Hillsdale & Green River Telephone Co. was held recently and resulted as follows: Jacob Pfeiffer, Ed. Herrington, L. A. Wambach, C. V. Robinson, William E. Deane, William Henderson and Jacob Madison. Immediately after the election the new board met and organized with William E. Deane, president; Ed. Herrington, vice-president; William Henderson, treasurer; Jacob Pfeiffer, secretary.

PARIS STATION, N. Y.—At the annual meeting of the People's Telephone Co. the following officers and directors were elected: President, J. W. Pughe; vice-president, M. W. Frawley; secretary and treasurer, A. W. Burritt; directors, R. M. Robets, H. F. Simmons and Thomas Riley.

BELLEFONTAINE, OHIO.—The directors of the United Telephone Co. at a meeting held recently elected the following officers for the coming year: President, J. Q. A. Campbell; first vice-president, Dr. F. M. Galer; second vice-president, Dr. W. S. Phillips; secretary-treasurer, Earl M. Smith.

BELLEVUE, OHIO.—The annual meeting of the Bellevue Home Telephone Co. was held recently, at which all the old directors were re-elected as follows: F. A. Knapp, B. F. Bell, R. T. Wolfrom, J. P. Ruffing, Chas. Bell, H. C. Stahl, G. A. Wright. The directors re-elected the following officers: President and general manager, F. A. Knapp; vice-president, B. F. Bell; secretary and treasurer, R. T. Wolfrom.

COLUMBUS, OHIO.—The stockholders of the United States Telephone Co. held their annual meeting recently and re-elected the old directors. They are as follows: F. H. McKnight, C. A. Otis, F. A. Davis, D. J. Cable, G. R. Johnston, F. L. Beam, H. M. Daugherty, E. R. Sharp, F. R. Huntington, W. L. Cary, F. W. Stevens and W. F. Burdell.

ORRSTOWN, PA.—The Orrstown & Roxbury Telephone Co. has elected the following officers for the ensuing year: President, D. H. Shields; vice-president, John Walter; secretary, S. N. Wise; treasurer, S. N. Wise; general manager, D. H. Shields. The company has over 100 subscribers and is making a number of extensions to its lines.

CHARLOTTESVILLE, VA.—At the annual meeting of the Farmers Mutual Telephone Co. the following officers and directors were elected for the ensuing year: J. M. Fray, president; B. I. Wood, vice-president; Charles A. Miller, secretary and treasurer; directors, E. L. Calhoun, Horace Garth, J. R. Maupin, Frank Michie, E. M. Brown and Samuel H. Marshall. It was decided to establish a new line from Charlottesville to Burnleys.

### Franchises.

DAYTONA, FLA.—Chas. S. Powell, of De Land, Fla., has made application to the city council for a franchise to construct and maintain a telephone system in Daytona. The proposed ordinance provides for the installation of a new switchboard of the automatic or universal common battery type, having a capacity for over 600 full metallic individual telephone lines. The proposed rates are: $18 per year for residence, and $24 per year for business telephones, single line. The company shall establish residence party lines whenever requested, the charges to be $6 a year less for four-party lines, $4 a year less for three-party lines, and $3 a year less for two-party lines, than the rates for single-line telephones.

CLAYTON, N. MEX.—The trustees of this city have granted a telephone franchise to Frank H. Clark.

RADFORD, VA.—The Virginia & Tennessee Telephone Co., with headquarters at Roanoke, has been granted a franchise to construct and operate a telephone system here.

### Miscellaneous.

BLOOMFIELD, IND.—The New Home Telephone Co., of Bloomfield, Ind., has changed its postoffice address to Linton, Ind.

MONON, IND.—Alpha and Lloyd Christley, of Boswell, Ind., have purchased the Monon Telephone Co., of this town.

PADUCAH, KY.—The Paducah Telephone & Telegraph Co. has purchased the properties of the Smithland Independent Telephone Co., of Smithland, Ky., which operates about 250 telephones, for a consideration of $5,000.

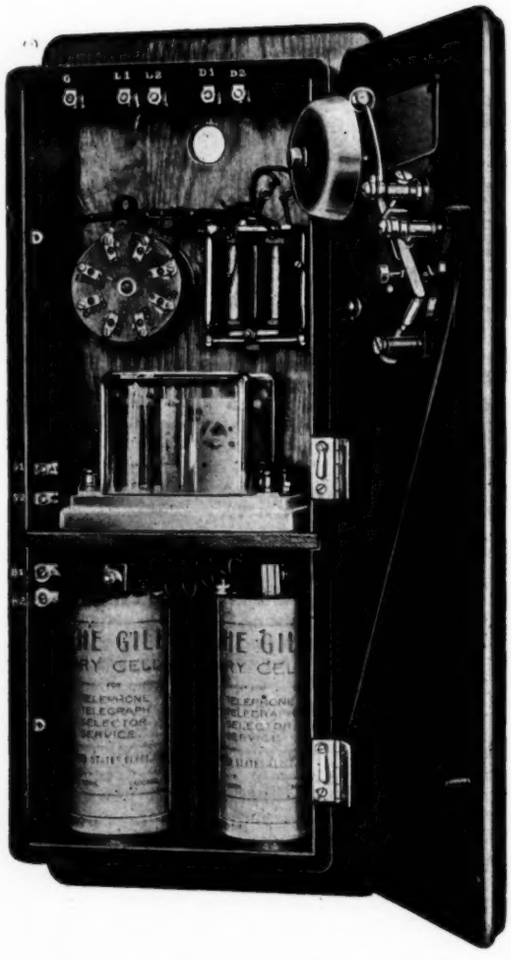
MORGAN, MINN.—The Redwood County Rural Telephone Co. has announced that a new switchboard of considerably larger capacity will be installed within a few weeks.

QUINTON, OKLA.—Milo T. Crane, of McAlester, has purchased the properties of the Quinton Telephone Co. from L. M. Finks.

SALEM, ORE.—The Dead Indian Telephone Co. has filed notice of dissolution.

CRAWFORD, TEX.—John W. Gee, the largest stockholder in the Crawford Telephone & Telegraph Co., has disposed of his holdings to W. T. Miller and E. Sadler, of Crawford, who will take over the active management of the system.

# Gill Telephone Selector Outfits



In four figure or two figure combinations and arranged for ringing by local battery or main line battery. So wired that they may be used without change for intercommunicating service. Has the widest range of operating current of any selective device and is operated with the minimum number of current impulses.

**Hall Switch and Signal Co.**
50 Church Street
New York
Chicago: Peoples Gas Bldg. Montreal, Canada
Works: Garwood, N. J.

## *Safety First*

**Chapman Lightning Arresters**

will not break, burn, fuse or blow up and bust, just when you need them most.

They are there with the punch and represent the highest type of

**Lightning Protection**

**MINNESOTA ELECTRIC COMPANY**
Minneapolis, Minn.

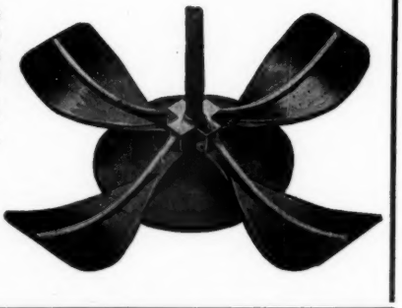
## The Self-Starting
# Flying Merkel Motorcycle

is the best motorcycle in the World. Six models—from $210.00 to $290.00. Write today for free 1914 Illustrated Art Catalog.

**The Miami Cycle & Mfg. Co.**
365 Hanover Street Middletown, Ohio

# The Faultless Anchor

The name tells a true story. The man who buys them, comes back for more—there is a good big reason. Send us your order and find out why. Write us.



**The Faultless Anchor Co.**
Fostoria, O.

# Rubber Covered Telephone Wire

**At Prices Never Before Offered. While This Lot Lasts.**

| | | |
|---|---|---|
| No. 19 Twisted Glazed Braid Duplex | per M ft. | $6.50 |
| No. 19 Twisted Glazed Braid Triplex | per M ft. | 9.50 |
| No. 19 Twisted Plain Rubber Duplex | per M ft. | 5.50 |
| No. 18 Single Saturated Braid | per M ft. | 3.75 |
| No. 18 Twisted Saturated Braid Duplex | per M ft. | 7.50 |
| No. 16 Twisted Saturated Braid Duplex | per M ft. | 9.50 |
| No. 19 or No. 22 Flame Proof Tw. Duplex | per M ft. | 6.50 |
| No. 19 or No. 22 Flame Proof Triplex | per M ft. | 9.50 |

F. O. B. St. Louis 10 per cent discount on 10 M ft. one kind or assorted.

**Central Telephone & Electric Co.**
310 N. 11th Street, St. Louis, Mo.

the basement or else in from a pole through the rear wall."

"I can readily see the point of Mr. Barrows' argument," said the architect. "His locating his exchange, or rather relocating it, involves a considerable amount of figuring not only from his present plant, which would not be so difficult, but from a viewpoint of future development of the business.

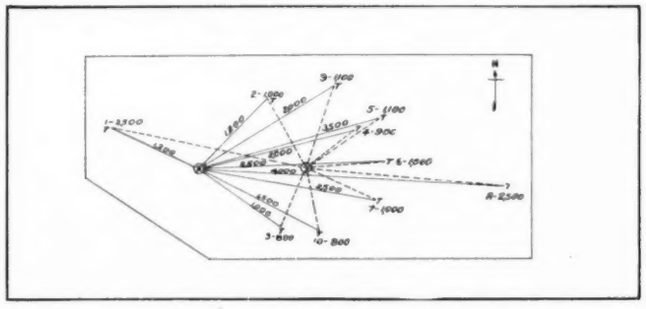


Fig. 88. Outline Showing Wrong Exchange Location.

It might prove out economical for him to buy a lot and build a small building for himself."

"All right, Barrows, I want to see that you are provided for, because this shack is coming down sooner or later," said Mr. Rankin. "Find out just where you want to locate and we'll see what we can do. I didn't know it was such a particular matter. Every business seems to have its peculiarities."

After a few minutes Mr. Barrows returned to his own desk. The problem of deciding upon the proper location for the exchange was one he had given but little consideration. Believing that there would be another day, he soon said good night to the Doctor and left the office.

The result of the impromptu illustration he had drawn up for Mr. Rankin's benefit, had been a surprise, even to himself. He could readily see that the present location of the exchange was "top heavy," so to speak; that is, a larger proportion of wire mileage extended south by east. A location in the new office building would be an improvement over the present, but the distance of removal was not great enough.

As no one could at that time state definitely in which direction future development would turn, he concluded to find the telephone center under the existing conditions and later decide upon the future requirements.

He decided upon a plan and the following day set the Doctor at work upon it.

The first move was the securing of a plat or map of the town, in skeleton, drawn to scale. This he fastened securely to a drawing board. Upon this, Mr. Barrows marked the location of the exchange. Then the Doctor was instructed to draw red lines across the plat, parallel to one another 1/16th of a mile, or 330 feet, apart, and to cross these with similar lines at right angles. These lines were drawn north and south, and east and west, regardless of the direction of streets and alleys.

The exact center of each square was located and lines drawn radiating from the exchange to each center mark. The distance in feet to each center was then determined and marked upon the representing lines. When completed the artificial blocking appeared as in Fig. 89.

After the Doctor completed his work of preparing the chart, Frank was called upon to make the record of stations in each square, by placing dots to represent the number of stations. A part of this work is shown in Fig. 89, in which a little more than 125 stations are located. To move the exchange to the location (*A*) proposed by Mr. Rankin would shorten more lines than would be lengthened. It can be readily seen that a point still farther south would be even more desirable.

When Frank finished his part of the work, the Doctor was again called upon to calculate the average number of feet of wire per station north as compared to south, and east as compared to west. It was found the location occupied was too far west and too far north. This study was not definite as to the exact number of feet the exchange was located from the telephonic center, so that further studies were necessary.

The Doctor devised a method for making several preliminary studies by using transparent tracing paper. With this method it was only necessary to trace new lines from an estimated location and follow through the calculations, securing a grand total footage.

It was finally determined that 1,500 feet south and 400 feet east would be the proper center.

Mr. Rankin's advice was sought as to the prospect of future growth and finally it was decided that the advantages lay with the property owners south. Mr. Barrows then made known the result of his effort to decide where the exchange should be located.

"Whew!" the liveryman exclaimed. "You can't get in over there. That is a resident neighborhood. I live over that way myself."

"Well, wherein would a telephone exchange be considered a nuisance?" asked Mr. Barrows. "It doesn't make any more smoke than any ordinary residence."

"How would that 'spiderweb' pole look on East street? Besides they are agitating getting the poles off that street as well as Main street," Mr. Rankin replied.

"There will be nothing unsightly about the premises. It is as cheap to go in underground on a new proposition. There need be nothing unusual about the building. In fact, if there

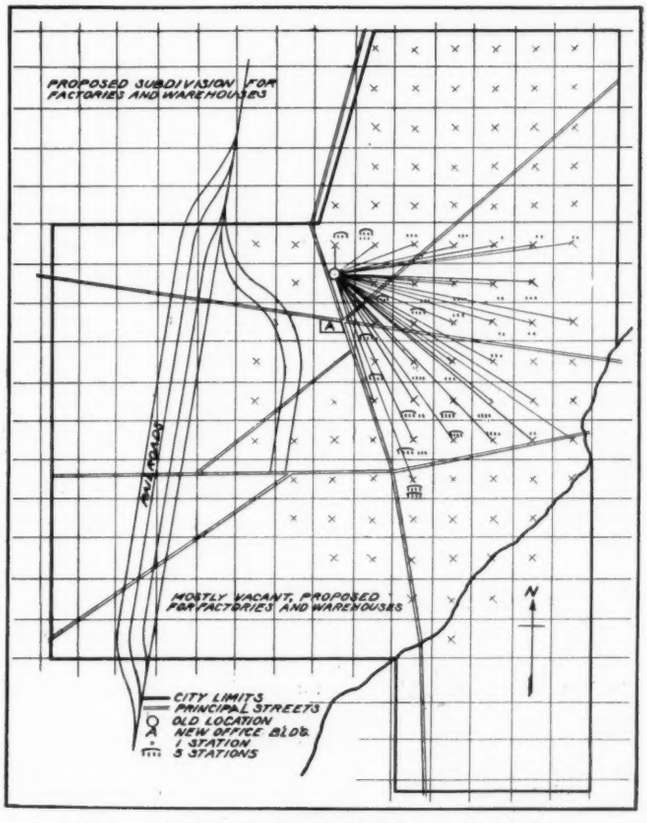



Fig. 89. Method of Charting Telephone Stations.

is a small house for lease or sale in that neighborhood, it would answer the purpose. Germany and Frank coming and going would not be an annoyance to anyone, for they are permitted on any street in town. Of course, a great many people come to the office each quarter to pay their bills, but there is never a rush—you know that."

"Yes," laughed Mr. Rankin. "There's been very little pushing and crowding that I've seen. Well, I'll see what's down